

The
Association of Special Libraries and
Information Bureaux

Report of Proceedings
of the
NINTH CONFERENCE
held at

Somerville College, Oxford
SEPTEMBER 23rd to 26th, 1932

THE OBJECTS OF THE ASSOCIATION ARE : To examine, foster, and co-ordinate the activities of special libraries, information bureaux, and similar services ; to act as a clearing-house for these services ; to develop the usefulness and efficiency of special libraries and information bureaux under whatever titles they may function ; and generally to promote, whether by conferences, meetings, or other means, the wider dissemination and the systematic use of published information.

The Association aims at assisting members who desire information of any kind to get into touch with the appropriate library or other body specialising on the subject ; it does not itself attempt to build up any centralised organisation to provide the detailed information direct.

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1932

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The Association of Special Libraries and Information Bureaux

16, RUSSELL SQUARE, LONDON, W.C.1

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- 2 MISS E. ATKINSON J. Walter Thompson Company.
- 3 MISS E. J. BAILEY Association of Head Mistresses.
- 4 E. A. BAKER, M.A., D.Lit. University of London School of Librarianship.
- 5 MISS K. BAVERSTOCK National Institute for Medical Research.
- 6 THEODORE BESTERMAN Society for Psychical Research.
- 7*M. S. BIRKETT, O.B.E. National Federation of Iron and Steel Manufacturers.
- 8 HARRY BLACKWOOD, M.A., F.E.I.S. Educational Institute of Scotland.
- 9 A. B. BLAKE, B.Sc., A.M.I.MECH.E. Birmingham University Library.
- 10 WILFRID BONSER, Ph.D., F.L.A. Science Library.
- 11 S. C. BRADFORD, D.Sc. Association of Supervising Electrical Engineers.
- 12 Mrs. S. C. BRADFORD Imperial Chemical Industries, Ltd. (Dyestuffs Group).
- 13 A. BRAMMER National Union of Teachers.
- 14 R. BRIGHTMAN, F.I.C., M.Sc. Association of Special Libraries and Information Bureaux.
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- 18 P. C. BURSILL, F.L.A. Royal Institute of British Architects.
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- 20 D. J. CAMERON Willesden Public Libraries.
- 21 EDWARD CARTER "World Power."
- 22 DR. F. D. CHATTAWAY, F.R.S. College of Nursing.
- 23*FRANK E. CHENNEL, F.L.A. Institute of Transport.
- 24 J. J. CONLAN Imperial Bureau of Animal Genetics.
- 25 MISS GERTRUDE COWLIN British Electrical Development Association.
- 26 F. W. CREWS, B.A. National Library of Wales.
- 27*MISS M. V. CYTOVICH Metropolitan-Vickers Electrical Company, Ltd.
- 28 V. W. DALE London and National Society for Women's Service.
- 29 W. LLEWELYN DAVIES, M.A. Chiswick Products, Ltd.
- 30 Mrs. W. LLEWELYN DAVIES Magdalen College.
- 31 MISS B. M. DENT, M.Sc. American Special Libraries Association.
- 32 Mrs. DEWAR The "Yorkshire Post."
- 33 MISS V. G. DOUIE Society of Chemical Industry.
- 34 MISS K. M. DOWDING City of Cardiff Public Libraries.
- 35 G. R. DRIVER, M.A. The Institution of Mining and Metallurgy.
- 36*ALLAN S. DUDLEY Nottingham University College.
- 37 W. R. DUNSTAN British Optical Association.
- 38 JAMES J. EATON Royal Arsenal.
- 39 A. A. ELDRIDGE Manchester Public Libraries.
- 40 HARRY FARR North-East Coast Institution of Engineers and Shipbuilders.
- 41 Mrs. HARRY FARR British Non-Ferrous Metals Research Association.
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- 43 G. ELLIS FLACK, M.A.
- 44*Mrs. G. ELLIS FLACK
- 45*MISS J. FLETCHER
- 46*MISS M. R. FLETCHER
- 47 HARRY FOSTALL
- 48 E. W. FRASER-SMITH, M.A., A.M.Inst.C.E.
- 49 B. FULLMAN

- 50 C. FULLER, B.A. London School of Economics and Political Science.
- 51 S. W. GIBSON British Thomson-Houston Company, Ltd.
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- 53 MISS MIZPAH GILBERT General Electric Company.
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- 57 PROFESSOR M. GREENWOOD, F.R.S. Institute of Metals.
- 58 S. C. GUILLAN Agricultural Economics Research Institute.
- 59 MISS E. HANDLEN Leeds Commercial and Technical Library.
- 60 RICHARD HAXBY, F.L.A. London School of Economics and Political Science, Joint Standing Committee on Library Co-operation, and Association of University Teachers.
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- 62 F. HENN London, Midland and Scottish Railway Company.
- 63 T. M. HERBERT Bodleian Library.
- 64 MRS. T. M. HERBERT Western Electric Company, Ltd.
- 65 R. H. HILL Royal Aeronautical Society.
- 66 F. A. HOARE Gas Light and Coke Company.
- 67 J. E. HODGSON British Aluminium Company, Ltd.
- 68 G. C. HOLLIDAY Royal Photographic Society.
- 69 FREEMAN HORN Imperial Bureau of Plant Genetics.
- 70 MRS. FREEMAN HORN Career Advisory Bureau and Journal of Careers.
- 71 H. V. HORTON, B.Sc., A.I.C. Manchester College of Technology.
- 72 P. S. HUDSON, Ph.D. Carnegie United Kingdom Trust.
- 73 MISS D. W. HUGHES Lewis's Medical and Scientific Library.
- 74 A. F. HUTT "Engineering."
- 75 R. S. HUTTON, D.Sc. Dr. William's Library.
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- 78 H. L. JACKSON British Medical Association.
- 79 HERBERT H. JOHNSON, M.I.Mech.E., M.I.E.E. W. T. Henley's Telegraph Works Co., Ltd.
- 80 MRS. H. H. JOHNSON League of Nations Union.
- 81 STEPHEN K. JONES, B.A., F.L.A. International Tin Research and Development Council.
- 82 MISS D. KNIGHT, B.A., F.L.A. Horace Plunkett Foundation (Co-operative Reference Library).
- 83 J. P. LAMB Warrington Municipal Library.
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- 85 H. I. M. LEWER Carnegie United Kingdom Trust.
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- 88 MISS F. E. MARKS British Electrical and Allied Industries Research Association.
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- 96 MRS. T. A. MORGAN

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Geographical Association.
- 98 PROFESSOR JOHN L. MYRES, O.B.E., M.A., D.Sc., D.Lit., F.B.A.
- 99*COL. SIR FREDERIC NATHAN, K.B.E.
- 100 LIEUT.-COL. L. NEWCOMBE, T.D., M.A., F.L.A. National Central Library.
- 101 R. H. NEW Clarendon Press.
- 102 CHARLES W. P. ORR Central Electricity Board.
- 103 MRS. C. S. ORWIN Agricultural Economics Research Institute.
- 104 MISS A. K. OSBORNE Brown-Firth Research Laboratories.
- 105 NORMAN PARLEY Percy Lund Humphries and Company.
- 106 E. J. PALMER Sir Alexander Gibb and Partners.
- 107 MISS M. PEARS British Cast Iron Research Association.
- 108 MISS E. W. PARKER Mond Nickel Company, Ltd. (Research and Development Department).
Croydon Public Libraries.
- 109 ALDERMAN JOHN O. PELTON, J.P.
- 110 MISS R. E. PENNINGTON
- 111 F. W. PETHICK-LAWRENCE, M.A.
- 112*PROFESSOR A. F. C. POLLARD Imperial College of Science and Technology.
- 113 MISS NANCY POWELL J. Walter Thompson Company.
- 114 J. F. POWNALL
- 115 MISS D. M. PRITCHARD Association of Special Libraries and Information Bureaux.
Victoria and Albert Museum.
Board of Trade.
- 116 A. VAN DE PUT
- 117 H. D. RICHARDSON
- 118 MISS R. M. RICHARDSON
- 119 A. F. RIDLEY, F.L.A. British Non-Ferrous Metals Research Association.
- 120 H. M. RILEY City of Leicester Public Libraries.
- 121*DAVID E. ROBERTS South Wales Institute of Engineers.
- 122*MRS. M. E. ROBERTS British Red Cross Society and Order of St. John Hospital Library.
- 123 HUGH L. ROBINSON Textile Institute.
- 124 W. H. ROBINSON National Union of Teachers.
- 125 KENNETH A. RYDE, M.C., A.L.A. Croydon Public Libraries.
- 126 SIR MICHAEL SADLER, K.C.S.I., C.B., LL.B., D.Lit.
- 127 ALEXANDER SANDISON, O.B.E., B.Sc. Croydon Public Libraries.
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- 130 LIEUT.-COMDR. F. L. SHIPMAN, O.B.E. Building Research Station.
- 131 ERIC N. SIMONS Edgar Allen and Company, Ltd.
- 132 MRS. ERIC N. SIMONS
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- 134 E. E. SKUCE, M.A. Oxford Public Libraries.
- 135 C. A. SPENCER, M.Sc. Department of Scientific and Industrial Research.
- 136 ALDERMAN CHARLES SQUIRE Leicester Municipal Library.
- 137 WILLIAM STOBIE, O.B.E., J.P., M.D.
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- 140*MRS. JOHN H. SUTCLIFFE
- 141 A. W. SWAN Brush Electrical Engineering Company, Ltd.
- 142*MRS. D. TAY British Optical Association.

- 143 MRS. PRIDGIN TEALE
 144 MISS L. G. THOMERSON, B.Sc. Research Association of British Flour Millers.
 145 A. P. THURSTON, M.B.E.,
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 146*PAUL R. L. TINGEY The Powell Duffryn Steam Coal Company,
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 149 L. C. WHARTON, M.A., F.L.A.
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 153 H. F. ALEXANDER Ministry of Labour.
 154 MISS L. B. DIBBEN University of London, Department of
 155 L. F. GILBERT Chemistry.
 156 MISS A. E. GLENNIE Low Temperature Research Station, Cam-
 bridge.
 157 MISS F. E. HOBLEY, B.Sc. National Federation of Iron and Steel Manu-
 facturers.
 158 S. O. MOFFET University College of South Wales and
 Monmouthshire.
 159 M. B. MORLEY Incorporated Association of Architects and
 Surveyors.
 160 MISS GUINEY Imperial Forestry Institute.
 161 R. L. SHEPPARD Bureau of Hygiene and Tropical Medicine.

* Prevented from attending.

Editorial Note.

THE papers that follow constitute a record of the proceedings of the Ninth Conference of the Association. Written papers were, as a rule, prepared in advance by the speakers, and these have been reprinted in full. No verbatim reports of the discussions were made, but, with the aid of notes taken by the Stewards of the meetings and provided by the various contributors to the discussions, as full a report has been printed as the limitations of space permit. It should be noted that where contributions have been summarised because of this limitation any reader interested may see the full report at the ASLIB office. The editors take this opportunity to acknowledge their indebtedness to all those members of the Conference who have sent in notes of their contributions.

An index to the contents of the Report is printed at the end. Copies of the Reports of the eight previous Conferences are still available, and the fifth Report contains an index to the first five.

These Reports are indexed in the Industrial Arts Index of The H. W. Wilson Company, of New York.

16, RUSSELL SQUARE,
LONDON, W.C.1.

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Reception and Opening Session.

Delegates were received before dinner by SIR CHARLES SHERRINGTON, President-elect of the Association, and the Council.

After dinner SIR CHARLES SHERRINGTON delivered a short address. He referred at the outset to the regrettable illnesses of Sir Frederic Nathan and the Secretary, Mr. S. S. Bullock. He thanked the Council of ASLIB for his nomination as President, and said that he felt himself in the position of an amateur speaking to experts. He intended his remarks to be general since they could not be specific.

Referring to two remarks made by Sir Frederic Nathan, he stressed the two main functions ASLIB could perform, namely the collecting of information and the bringing home to ninety-nine out of every hundred people the availability of information. He pointed out that the production of information was on an enormous scale as compared with the means of distributing it. For example, whereas in 1905 the number of papers on the comparative small subject of physiology alone was 3,500, this number had grown in 1927 to 18,000. The World List showed 27,000 separate publications, an enormous output with which he wondered if we could keep pace. On the basis of this list, one paper on a scientific subject was being published every half minute.

He went on to say that London alone had twice as many of any one periodical as it needed and used, use being dependent often on good placing and general availability. Could we afford this duplication? Economy might be effected by better co-operation among libraries. He referred to the excessively high cost of German periodicals on medicine, against which the Americans had already protested. The articles were diffuse and prolix, which partly accounted for the high cost. New scientific periodicals were continually arising owing to the development of new subjects. Was it fair to launch these in these difficult times and so strain already slender resources? New centres of production—*e.g.*, Japan, China, Latin America, Italy, turning out much first-rate stuff, were all increasing the world output of scientific literature. Organisation alone could steer through these difficult times. There should be co-operation to prevent overlap. Special libraries in kindred subjects might agree to reserve a fringe of their budget for taking by common consent what none of the others took. Gaps would thus be filled. He regretted that the war had killed the general scientific catalogue and hoped it would be resumed in better times.

The Evening Session was devoted to an address by PROFESSOR J. L. MYRES entitled "Science and the Humanities: the Use and Abuse of Information." PROFESSOR MYRES had not prepared a paper which could be printed in this Report, but his address was of such special interest and gave so much pleasure to those who heard it that, with his kind consent and collaboration, it has been decided to publish it separately. Copies will be presented to members and will be available to others by purchase for a small sum.

The Year's Work of ASLIB.

This report on the work of the Association is presented in the usual form. It is a very brief account covering the main activities of the year. A record of all the work carried out by the Association's Council, Committees, and Staff would be too long and too detailed. Matters, too numerous for individual mention, but germane to the objects of the Association are constantly under review and receive continuous attention. In the past there has been a discussion on this report but this year it is proposed, with the consent of the members, that they should raise any questions in the course of the discussion on "What members want of ASLIB" which is to be opened by Mr. H. L. Robinson. Given a lead by a member keenly interested in the work of the Association and especially active on its behalf it is hoped that the discussion on what may be termed domestic matters will be more useful to members generally and more of a guidance to the Council than it has sometimes been.

THE ASSOCIATION'S COUNCIL AND COMMITTEES.

The first meeting of the new Council, elected at the last Annual General Meeting, was held on November 9th, 1931, when Dr. R. S. Hutton was re-elected Chairman and Colonel Sir Frederic Nathan, Vice-chairman. During the year seven meetings of the Council were held. In December Mr. F. B. Bourdillon was obliged to resign his membership and Miss Margaret Cleeve was co-opted in his place.

The Council appointed a Committee, consisting of Dr. S. C. Bradford, Mr. J. J. Eaton, Mr. B. M. Headicar, Mr. J. E. Hodgson, Dr. R. S. Hutton, Miss A. L. Lawrence, and Colonel Sir Frederic Nathan, to make arrangements for the Conference and this Committee has held a number of meetings. The question of a new provincial centre for the meeting was fully considered, but for various reasons was found impracticable this year.

So far as general arrangements were concerned the Committee felt that only in one or two matters of detail need there be any difference from last year. If this attitude appears to suggest a state of too much satisfaction it is due to the expressed opinions of members, many of whom spoke highly of the Conference at Lady Margaret Hall, while none offered criticisms. But criticism is invited. Indeed, the Conference Committee must depend upon members to point the way to improvements.

In addition to the Conference Committee and other committees which are mentioned in their place later in the report, there have been many meetings of a sub-committee consisting of the Honorary Officers, at which much of the Association's business has been carried out or prepared for consideration by the Council.

FINANCE AND MEMBERSHIP.

The audited Annual Accounts of the Association have been circulated for consideration at the Annual General Meeting, and need not be referred to here in detail. Twenty-six new members

have been enrolled during the year, but these have been rather more than offset by resignations so that there was a small net loss of members. This was not reflected in the accounts by reason of the special donations made by members of the Council in response to an appeal by the Chairman. Since the beginning of the new financial year there have been some further resignations and it is too early to say whether new memberships will equal or exceed them. As a set-off against this further curtailment of membership the response of members to the special appeal for extra subscriptions for this year which was issued to them in June, will, it is hoped, tide over the present abnormally difficult time. A certain loss of members each year is to be expected at the best of times. Under present circumstances when the likelihood of loss is greater than usual and the difficulties in the way of the recruitment of new members are equivalently serious the Council believe that ASLIB has suffered less comparatively than the majority of organisations which depend upon subscription incomes. They believe that if the Association can bravely face its present stringency a little longer it will not be many years before it is enjoying the complacency which it deserves as a result of "early struggles" and successful achievements.

LOCAL CORRESPONDENTS.

Miss B. M. Dent, secretary of the Manchester Branch of ASLIB, sends the following report: "The work of the branch, which was formed early in 1931, has proceeded steadily throughout the year. It is gratifying to report an increase in membership; eight new members having joined the branch. There has been one resignation, bringing the total number of members to twenty-six. Two meetings have been held during the year. The autumn meeting, originally fixed for October 28th, had to be postponed owing to the General Election, and was held on December 15th, at the College of Technology. The speaker on this occasion was Mr. H. T. Tizard, Rector of the Imperial College of Science and Technology, and President of ASLIB, who gave a most interesting address on 'Accurate Information and how it may be obtained.' This meeting was open to the public, many potential members being especially invited. A full account has already appeared in the 'ASLIB Information.'

"A meeting for members and their friends was organised on Tuesday, March 8th, and took the form of an informal discussion based on a questionnaire drafted by Dr. Withers, Chairman of the branch. The main points discussed were technical abstracts and translations, accessibility of Government publications, and the selection of books for public libraries. The Committee is following up the suggestions made at this meeting.

"All members have recently been asked for suggestions for subjects of discussion, and the Committee has decided that the best type of meeting for the branch will consist of a short paper, followed by an informal discussion, whereby different points of view can be put forward and experiences pooled for the general benefit. The next branch meeting is fixed for Tuesday, September 13th, 1932, when Dr. Brightman, I.C.I. Dyestuffs Group, has consented to give a paper summarising his experience in the establishment and development of his information service.

"The Committee has been exploring the possibility of holding the Annual Conference in the North of England or the Midlands at some future date. It appears that Nottingham would be an excellent alternative suggestion to Oxford or Cambridge. In Liverpool and Manchester, however, the necessary accommodation is not available.

"A union list of scientific, technical, and commercial literature taken by members of the branch is being compiled, and although work on the list has been delayed through various causes, it is now progressing favourably and the Committee hopes to be able to distribute copies to members shortly."

Mr. Richard Haxby, Local Correspondent in Yorkshire, writes : "The efforts to form a branch of ASLIB in Yorkshire have been disappointed partly due to the prevailing depression within the area and the unwillingness on the part of manufacturers to commit themselves even to the small amount of the subscription, and to the lack of appreciation of the value of systematised information.

"Early in 1932 a new attempt was made to create local interest in ASLIB. A series of meetings was arranged with the object of discussing the informational needs of local industries and in each case a specialist was invited to speak about his work, how far it is served by existing information services, what information it requires, and in what respect information is found to be lacking or difficult to obtain. The first meeting, on February 25th, was addressed by Mr. T. H. Sanders, M.I.M.E., an authority on springs and general engineering, the subject being 'Man and the Machine.' At the second meeting on March 18th, Mr. David Little dealt with the 'Creation and Growth of the Wholesale Clothing Industry.' Both papers were followed by a lively discussion. However, the attendances were not sufficient to justify continuance of the experiment.

"A numerical increase in the membership of ASLIB has not resulted from our efforts in Yorkshire, and it is proposed to delay further work until a more propitious time. Some good might result from the publication of a leaflet setting out examples of practical benefit accruing to members by the use of information supplied by ASLIB. Our Yorkshire business men must be assured of value for money."

It is unnecessary to say that the Council is equally indebted to local members in Lancashire and in Yorkshire for their efforts on behalf of the Association irrespective of their success. At the same time the difference between the results obtained in these two adjoining districts cannot but be remarked, and it is being studied so that the lessons which it must contain may not be lost.

THE ASLIB ENQUIRY BUREAU.

The Bureau continues to perform its unobtrusive service for those members who make use of it. They find themselves in difficulty over some piece of information ; they resort to ASLIB and, almost without exception, they obtain valuable assistance. The word unobtrusive is used about the work of the Bureau—which, incidentally, constitutes no small part of the daily duties of the Association's staff—because very little has been made of it at Conferences or in these reports and, for that reason, its value is perhaps not fully appreciated. In so far as there has been any conscious reticence about the work of the Bureau the reason for it may be two-fold. In the

first place, whilst the Council is anxious that members should make the fullest use of their Association, it would, undoubtedly, be an embarrassment if every one of the three hundred odd members began at once to rain enquiries on the office. And, secondly, the work of the Bureau like the deductions of Sherlock Holmes, seems to be so very easy when it is explained. In so far as it is carried out with ease that it is due to the accumulated experience of the Bureau and to the organisation of the Association on which it can base its work. It could be made easier still if enquirers would remember to bear three points in mind, firstly, to be as definite as possible about the information they want; secondly, to indicate the purpose for which it is needed; thirdly, to say what steps they have themselves taken to find it before resorting to ASLIB.

A recent enquiry was: "Where can we obtain information about platinum?" Such a question only gives rise to a number of others: What about platinum?; its physical properties?; its sources?; its production?; its industrial uses?

A frequent experience of the Enquiry Bureau, pursuing some obscure piece of information on behalf of a member, is to find that the member has already approached directly a number of the possible sources. This means delay and duplication of work, and is, moreover, a cause of annoyance to those who have to answer the same question twice.

PANEL OF EXPERT TRANSLATORS.

A request somewhat similar to that in the last paragraph has to be made about the ASLIB Panel of Expert Translators. Members who apply for the name of an expert translator should give as much information as possible about the translation work to be done. An application, "Can you give me the name of a translator for technical German?" invariably means delay whilst the necessary information to enable ASLIB to fulfil the requirement is obtained. What, exactly, is the technical subject involved? Is it a book, or a trade catalogue, or an article in a journal, or a letter?

No translator has been enrolled on the panel without possessing high qualifications, both in the language and in a limited sphere of technical or literary experience, but that does not mean that all are equally well fitted for a given piece of work nor that they are willing to undertake any work that may be offered to them. In each case it is a matter of selecting the best man for the job according to his qualifications, experience, and interests, and that is possible only if the nature of the work is specified in detail by the would-be employer. As a description of the subject-matter, "Engineering" or "Chemistry" is not definite enough. With nothing better than that to go on ASLIB might offer a man for "Engineering" whose special experience was in concrete construction, when a translator with knowledge of Diesel engines was really wanted.

The number of enquiries received for translations has diminished somewhat in the past year. In part this can be attributed to continued utilisation of translators previously introduced to members and others through ASLIB, but it is due also, no doubt, to the period of economic depression and to the fact that there has been no advertisement of the Panel on the scale which was made possible the year before by

the fund created by the translators' enrolment fees. Few new names have been enrolled and the only source of income for the Panel is the renewal fees of the members. There is no doubt that the Panel is not nearly so well known as it should be, but its advertisement depends largely upon the active goodwill of ASLIB members. A large proportion of them are connected in turn with other associations whose members form a potential clientele for the Panel and who can be reminded of it from time to time by circulars and by paragraphs in their own journals. Members will not object to being asked again for help in advertising the service of the Panel by these and any other means.

Several appeals have been made to members for this kind of assistance but, with few exceptions for which the Association's thanks are due, the appeals have met with no response.

As the result of a suggestion made at the Abstracts Conference those enrolled on the Panel have been circularised to enquire whether they were willing and qualified to undertake the abstracting of foreign periodicals. It is now possible, therefore, to obtain through the Panel the names of abstractors covering a wide range of languages and subjects.

ASLIB DIRECTORY.

The sales of the Directory during the year were twenty-one copies, eight by the Oxford University Press and thirteen by the Association itself.

The revision of the existing entries continues systematically as the time of the staff permits, and new sources of information are also recorded, of course. A proportion of the amendments and additions have been published in "ASLIB Information." The Directory records have, therefore, been kept in good condition and they are not far or seriously out of date.

There remain over 500 copies of the Directory unsold. They are practically as valuable for reference as on the day of publication since the proportion of entries which require important corrections is small. It is inevitable, however, that a reference book, dated 1928, should be regarded as somewhat *passé*, and ways and means of disposing of the remaining stock, other than through the usual book-selling channels, may have to be considered.

"ASLIB INFORMATION."

The publication of this quarterly continues and there has been ample evidence of its usefulness to members individually and its value to the Association as a whole. There are still some members who do not consider it worth their while to spend the few minutes (once in three months) which a glance through its columns entails, but prefer to occupy a longer time by writing specially to the Association's office for the information those columns contain.

ASLIB AND CLASSIFICATION.

The Joint Committee of ASLIB and the British Society for International Bibliography has continued its meetings and its work. Progress towards an edition in English of the Universal Decimal Classification has been slow and depends at the present time upon

the conclusion of the work of achieving uniformity between the Universal Decimal Classification and the Dewey Decimal Classification, a matter which is in the hands of the Institut International de Documentation. In the meantime the Joint Committee has been devoting itself largely to the question of the indexing of periodicals and some of the results of its deliberations will, no doubt, appear in the paper presented at this Conference by Dr. Bradford and Professor Pollard.

ADVANCE INDEX TO SCIENTIFIC PAPERS.

Another matter which has been referred to the Joint Committee for their consideration is a proposal, made by Dr. Bradford, for an index, to be published in the form of a monthly bulletin, to the papers contained in the proceedings of scientific societies, so as to obviate the delay, often of a year or more, which occurs between the time when a paper containing original work is accepted for publication by a society and the time when its existence becomes known to the scientific public. Close consideration is being given to this proposal and it is intended shortly to approach the societies upon whose co-operation the scheme would depend.

THE ABSTRACTS ENQUIRY.

As a report on this enquiry is being presented at the Conference by Mr. Eldridge there is no need to refer to it here at length.

Undoubtedly, this enquiry has been of value but it is important to remember that its scope was limited to one of a large number of possible lines of co-operative action. With the experience gained it should be possible to utilise similar methods through the agency of ASLIB to co-ordinate the experience and interests of abstracting sections of the learned societies, etc., on other questions, *e.g.*, there appear to be prospects of considerable economies if attention were paid to pooling the experience of the several bodies concerned on the cost of printing and publication.

INDEX TO UNPUBLISHED DOCUMENTS.

The following resolution was referred to the Council by the 1931 Conference :

That this meeting, recognising that the indication of the sources of information is one of the prime functions of ASLIB, considers it of the utmost importance that members should be able to obtain direction to the many (especially unpublished) documents compiled by various institutions and societies throughout the country, and recommends that, with the co-operation of the institutions concerned, an index of this material should be available at ASLIB Headquarters.

The first meeting of the new Council was held on November 9th, and, after discussion, it was decided that a small committee should be set up to consider the proposal in detail. The Committee was appointed as follows: Mr. B. M. Headicar (London School of Economics), Chairman; Mr. A. F. Ridley (British Non-Ferrous Metals Research Association); Mr. H. L. Robinson (Textile Institute); Mr. C. A. Spencer (Department of Scientific and Industrial Research).

The Committee decided to attempt, in the first place, to form such an index on an experimental scale. A letter explaining the purpose

of the index and inviting institutions to co-operate was prepared together with a form indicating the scope of the index and the information required about the documents to be included. This explained that the index was to comprise all documents, in print, typescript, or manuscript (*i.e.*, memoranda, reports, theses, translations of foreign articles, catalogues containing scientific and technical data, papers read at meetings, etc., etc.) which are not published in periodicals, proceedings, etc. The information asked for about each document was: Its title and/or sufficient indication of nature of contents, its author (if any), its nature (*e.g.*, typewritten thesis, printed report, translation), its length, the date when it was prepared, the terms on which it is available (*e.g.*, free on application, on sale, on loan, for consultation at institution, only to members of institution).

The invitation to take part in the formation of the index was sent to about sixty selected ASLIB members, with a view to judging, by their response, what results would follow a wider appeal and how much work the compilation of the index would entail. Unfortunately, owing to the illness first of Mr. Headicar and then of Mr. Bullock, the examination of the replies has been long held up, so that there is now nothing further to report. By the time of the Conference it may be possible to add something verbally.

THE BUSINESS MAN'S DIRECTORY.

As a session of the Conference is devoted to this subject it is unnecessary to refer to it here.

RECEPTION AT THE SCIENCE MUSEUM.

Being of the opinion that it would be advantageous for the Association if members were given an opportunity to meet each other between one Annual Conference and another the Council approached Sir Henry Lyons, and he readily consented to give a reception to members and their friends. This was held at the Science Museum, in April. A large number of members attended and it was a great success; so that it is intended to arrange for similar gatherings in the future.

Before closing this brief record of the year's work the Council wishes to express its most sincere thanks to Mr. H. T. Tizard on his retirement after serving for two years as President, for the assistance he has given the Association during that period.

During his period of office Mr. Tizard has taken an active interest in the Association and by attendance at our Conferences, by visiting the Manchester Branch and in numerous other ways has given ASLIB the benefit of his stimulating influence. The generosity with which he has given his help has been equalled only by the results which his active support has produced.

R. S. HUTTON,
Chairman of the Council.

S. S. BULLOCK,
General Secretary.

Systematic Subject Indexes to Periodical Volumes.

By PROFESSOR A. F. C. POLLARD

AND

DR. S. C. BRADFORD.

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1. PREAMBLE.

In a previous paper* we have discussed the practical disadvantages of the Alphabetical Subject Index, which is the form of subject matter index hitherto generally accepted for periodical volumes of current bibliography, such as those devoted to scientific and technical abstracts, scientific data, etc., etc. We have endeavoured to show by numerous examples taken at random from various publications of the highest class, that the Alphabetical Subject Index, when put to the use for which it was designed, not only fails to indicate exhaustively the references to the information sought, but is frequently so involved as to be positively misleading.

Moreover, the Alphabetical Subject Index must be evolved from some kind of primary classification, necessarily incomplete, which is hidden from the searcher and which, in all the examples examined by us, not only differed completely in each case, but was obviously

* "The Inadequacy of the Alphabetical Subject Index." The Association of Special Libraries and Information Bureaux. *Report of Proceedings of the Seventh Conference*, 1930, p. 39.

regarded by the compilers as secondary in importance. This necessitates on the part of the searcher a laborious study of the incomplete system in each publication that he may wish to consult, finally leaving him with the undesirable conviction that much information has escaped his laboured search.

The reasons for this failure of the Alphabetical Subject Index and some objections to the use of it were tabulated by us as follows :

- 1 References to *related subjects* must be scattered throughout the whole repertory.
- 1.1 There is no method of co-ordinating related references within the subject except by a complicated labyrinth of cross-references which is difficult or impossible to elaborate with completeness, and is time-wasting for the searcher.
- 2 There is the danger of dissociating references to *essentially the same subject* by the use of synonyms.
- 2.1 This danger can be reduced by employing a concealed classification together with a second elaborate system of cross-references—*i.e.*, from synonyms. But as the unseen classification is inflexible and necessarily incomplete, the indexer is forced to employ terms, usually taken from the authors' titles, which do not belong to the concealed classification and are unconnected with either series of cross-references.
- 3 Essentially unrelated references are likely to be brought together under terms that may have widely-differing meanings—*e.g.*, such words as "Survey" may mean almost anything.
- 4 There is risk of assuming that an expression used metaphorically is intended literally; and
- 5 The use of an alphabetical system excludes the possibility of collaboration with other bibliographers, especially in different countries.
- 5.1 This implies the perpetuation of the present chaos of independent bibliographical effort, with a maximum of inefficiency and of labour to the searcher.

In the closing paragraphs of our paper we emphasized the fact that documents are not dissertations upon *single words*, only with which the Alphabetical Subject Index is in reality fit to deal, but are concerned with *notions* which frequently are extremely complex.

We indicated that a classification of notions should be the outstanding feature of a rational index and should always be in evidence and not hidden. To facilitate the practical use of such a classification some system of correlated symbols is necessary that can be arranged only in one definite and unmistakable order and which will admit of combination, much in the same way that complex concepts of the human mind are compounded of simpler concepts.

Such a classification must of necessity be accompanied by an alphabetical index to guide the searcher to the particular part or section of the classification with which he is for the moment concerned. This alphabetical index will consist of simple terms only with their relative terms grouped beneath and it cannot replace the classification itself, since many of the more detailed subdivisions require lengthy phraseology to convey the meaning of the symbols attached to them.

We finally indicated how a key manual could be prepared containing that part only of the classification and alphabetical relative index which would serve as a generalised index to any given bibliographical periodical provided its bibliographical entries are mounted on cards and arranged in order of the classification symbols, with the advantage that this key manual and index would be subject to revision only at lengthy intervals.

We concluded with a comparison of the advantage of such a method of indexing with the disadvantages of the Alphabetical-Subject Index as follows :

- 1 Related references are brought together by the classification,
 - 1.1 and consequently cross-references within the subject are not required.
- 2 The classification enforces the contemplation of notions, the same subject must be indexed always in the same place.
- 2.1 No series of cross-references from synonyms is required, since the classification is not concerned with titles,
- 3 apparent similarity of terms, or
- 4 metaphorical expressions. Thus the use of a standard classification ensures a maximum of efficiency, and
- 5 serves to unify the work of all those using the same system, so that their references may be brought together into a single index, which may be consulted with a minimum of effort.

Subsequently one of us* suggested a method of preparing indexes which may be incorporated with the periodical volumes, thus obviating the necessity of providing a key manual and mounting the entries from the separate parts and arranging them in classification order. In this method a systematic subject index is built up as the indexing of the references proceeds. This is in reality part of the classification itself, similar to a key manual, with the addition of references to the relevant articles or abstracts, but so much more fully developed as to correspond precisely with the notation appearing on the references themselves. Such a fully developed classification could not be possible in a key manual, which is prepared without specific consideration of individual references.

Recently we have had the opportunity of applying the method suggested to the construction of the index to the first annual volume of the British Power and Fuel Bulletin which is issued in monthly parts by the British National Committee of the World Power Conference. In this we are signally fortunate, since the Bulletin is the British section of an international bibliography classified in accordance with the Universal Decimal Classification and similar Bulletins are published by other National Committees of the World Power Conference. Thus the Japanese, the German, and the South African Bulletins have already made their appearance and offer the opportunity of testing the universal nature of the new index to which we shall refer later. As far as we are aware, the principles underlying the method

* British Society for International Bibliography. Discussion on Indexes to Decimally Classified Publications, 16th April, 1931, opened by Professor A. F. C. Pollard.

that we have applied to the construction of the index to the British Power and Fuel Bulletin are new and in a sense revolutionary. We therefore gladly present the following description of the application of this method to the construction of what we believe to be rational and more useful subject indexes in general, illustrated with examples taken from the existing index of the British Power and Fuel Bulletin.

2. THE SYSTEMATIC SUBJECT INDEX.

As the classification is of fundamental importance in the construction of systematic subject indexes, the selection of a suitable classification will depend upon the use that is to be made of the index. If the index is to be of international utility, it is obvious that a well-known and standard classification should be used which has a notation that can be understood without a knowledge of the language in which the index is written. Moreover the classification should be fully developed in all branches of human activity which can form the subject of written matter. The only classification existing at the present time that fulfils these conditions is the Universal Decimal Classification with its decimal notation. As this bibliographical classification is widely known and has been described in numerous papers, we shall assume a knowledge of its practical application to information services and merely state that it has been selected by the World Power Conference as the standard classification for co-ordinating the contents of the various national Power and Fuel Bulletins.

A recent and enlarged edition of the Universal Decimal Classification is in course of publication by the Institut International de Documentation of Brussels and has been issued with the exception of the alphabetical index which is nearing completion. An English edition will be published as soon as it has been possible to overcome certain difficulties of concordance with the American Dewey Decimal Classification, from which the Universal Decimal Classification has been developed. The English edition will materially assist the spread of the U.D.C. in English-speaking countries. In the meantime other translations are appearing, notably in Germany, Spain, and Czechoslovakia. As a classification which is well known and widespread in use is desirable when considering its application to the formation of systematic subject indexes, it might be mentioned that the U.D.C. is in use in France, Belgium, Denmark, Hungary, Italy, Latvia, Luxembourg, Norway, Poland, Roumania, Spain, Switzerland, Union of Soviet Socialist Republics, Argentine Republic, Chili, and China, in addition to the countries already mentioned.

Having selected the classification to be used, the abstracts, bibliographical references, scientific and technical data or other matter to be indexed are then classified by affixing the appropriate symbolic notation of the classification to each bibliographical reference.

The following example of an abstract taken from the Power and Fuel Bulletin shows the decimal number of the U.D.C. printed in the top right-hand corner in conspicuous type, and it will be noted that this number, which implies *Pelton wheels in the utilisation and distribution of hydraulic energy*, fully represents the information contained in the abstract.

1932.01.08. Some Large Pelton Wheels*Engineer, Lond.* 1932, **153**, 49-50.

[Particulars are given of four large hydro-electric Pelton wheel units which have just been constructed. Each of these machines is of 17,000 horse-power; they are claimed to be the largest single-runner Pelton turbines ever made in Great Britain. They work under a head of 2,000 ft. at 428.5 r.p.m. The wheels are overhung and various other special features of design are embodied in the valve and governing mechanism. Stainless steel is largely used in the construction and the plant throughout is automatically controlled, both mechanically and electrically, by an oil pressure and servo-motor system. [33]

When, however, the abstract or reference contains information which cannot be represented by a simple decimal number, the necessary simple decimal numbers or compounded numbers are printed in the same position, as shown in the next example, which was taken by chance :

Godbert, A L
Wheeler, Richard Vernon

662.66 : 541.126
622.814

1932.01.22. The Combustion of Coal Dust

Safety in Mines Res. Bd. Paper No. 73. London : H.M. Stationery Office. 9d.

Reviewed in *Colliery Guard*. 1932, **144**, 168.

[The research described in this paper is supplementary to the study of the relative inflammability of coal dusts (Paper No. 56), and affords an explanation of some of the findings of that research. Both researches show that the initial ignition of a coal dust is determined by the reactivity of its ulmin material and by the proportion of highly inflammable non-ulmin material it contains. [19]

These numbers have the following meanings in the classification :

- 662.66 Coal and anthracite as fuel.
- 541.126 The physical chemistry of spontaneous reactions, explosions, reaction regions.
- 622.814 Prevention of coal dust explosions in the mining industry.

The first two numbers compounded by the colon indicate that the information is concerned with the subjects of these numbers in relation to one another, while the third simple number indicates that the paper refers to another aspect of coal dust explosions, which is not mentioned in the abstract. It will be noticed that the U.D.C. numbers indicate the nature of the information in a concise and accurate manner. Experience has shown that abstracts cannot always be relied upon to give sufficient information for assigning the correct decimal numbers, and this indicates that the decimal numbers frequently are more accurate representations of the information contained in the original papers than the abstracts. It is therefore necessary in many cases to assign the decimal numbers after perusal of the original papers rather than the abstracts, which are prepared by various people.

The abstracts or references may be arranged in order of the decimal numbers in a "part" of the work, but since in some cases more than one decimal number is affixed to a reference and several parts constitute a volume, the classified arrangement of the references must be broken. This necessitates an index and means for identifying a reference in some simple manner. The latter can be effected by using

the number of the volume and page in which the reference appears, or a cardinal number, called the reference number, affixed to the reference. The abstracts of the Power and Fuel Bulletin are identified by such cardinal numbers which may be seen in square brackets at the termination of the abstract in the examples given. The cardinal numbers form an unbroken series for each volume, so that to identify any given abstracts it is only necessary to state the volumes and the cardinal numbers, thus :

I 26, 128, 196. II 3, 4, 10, etc.

It is preferable to identify a reference in this way, since if the work consists of many volumes, the required volume is at once indicated, which avoids the time wasted in selecting the wrong volume, as frequently happens when the references are numbered by a continuous series of cardinal numbers irrespective of the volumes.

No rules are required for this simple method of identifying a reference in the work, and the Roman and Arabic numerals which are used are as universally recognised as the decimal numbers of the classification itself.

The assignment of the decimal numbers and the cardinal numbers to the references is the first step in the construction of the Systematic Subject Index which comprises two parts :

- 2.1 The Alphabetical Subject-Decimal Index
- and 2.2 The Decimal-Reference Index.

2.1 THE ALPHABETICAL SUBJECT-DECIMAL INDEX.

This part of the Index consists of a relative alphabetical index of principal terms of the classification with their specific symbols, or classification numbers, and is in fact the duplicate of that part of the Alphabetical Index of the classification itself which is required for the work in hand.

It is therefore evident that this part of the Index is not required by those to whom the complete Alphabetical Index of the U.D.C. is available.

In the case of the Power and Fuel Bulletin the Alphabetical Subject-Decimal Index is cumulative and is built up as the work proceeds, since the Alphabetical Index of the U.D.C. is not available for consultation by all subscribing members to the Bulletin.

Many of the difficulties inherent in the construction of this index are common to all alphabetical indexes, and definite rules require formulating if confusion among a number of collaborators is to be avoided.

These difficulties are known to those few who have had experience in the construction of large indexes and attempts to formulate rules have been made. In view of the special nature of the Alphabetical Index to the U.D.C. and the Alphabetical Subject Decimal Index, it was necessary to consider the whole matter *ab initio*, and an entirely new set of simple rules has been evolved which reduces the number of index entries to a minimum, clearly defines their precise form, and renders their meanings unambiguous.

The rules, given as an appendix to our previous paper referred to above, have now been thoroughly revised, and the new rules are printed as Appendix I to the present paper.

As an example of a correctly constructed Alphabetical Subject-Decimal Index a sample page of the Power and Fuel Bulletin is reproduced in Appendix II. In this it will be noted that only principal terms with their simple decimal numbers are listed. As already stated, this index is cumulative in the sense that only those terms are entered which are definitely required by the subject matter of the work. It is evident that as the indexing proceeds the number of additional terms required will decrease, and after the completion of the index for the first annual volume of the work the additional terms required for the second annual volume will depend upon the amount of new subject matter which is encountered. After a period of two or three years the index will become "saturated," and the occasional terms which are required from time to time may be issued as a supplementary list, when the further cost of preparing the alphabetical index becomes negligible.

The Alphabetical Subject-Decimal Index once constructed in this manner is a perpetual guide not only to the Decimal-Reference indexes of all volumes of the work, but in such a case as that of the Power and Fuel Bulletins, to those also of all the national Bulletins in whatever language the abstracts may be written.

It will thus be seen that this alphabetical index is perpetual and international in virtue of the decimal numbers which serve as a universally understood symbol connecting the principal alphabetical terms written in any one language with the references themselves written in any other language.

Moreover, if all the articles or abstracts in a part of the publication are arranged in decimal order, the Alphabetical Index to the previous complete volume will serve as a key to the parts issued subsequently before the Decimal-Reference Index to the new volume has been completed.

2.2 THE DECIMAL-REFERENCE INDEX.

This part of the Systematic Subject Index is the index proper to the work concerned and, like the alphabetical part, is built up as the work of indexing proceeds. It consists of the required symbols of the classification arranged in order of sequence for the purpose of immediate selection, each symbol being followed by the reference numbers of the bibliographical references indexed under that symbol. When the U.D.C. is the classification used the symbols are the decimal numbers arranged in the decimal order. Actually the Decimal-Reference Index with its ordered sequence of decimal numbers followed by the reference numbers of the relative abstracts, articles, or bibliographical references, corresponds to a card index with the mounted references or catalogue titles arranged in order of their classification numbers.

The decimal numbers of the Alphabetical Subject-Decimal Index are exclusively simple numbers corresponding to principal terms, but the decimal numbers of the Decimal-Reference Index are exact copies of those appearing on the references and may be compound as well as simple; they correspond to far greater detail within the subject than those of the alphabetical index. The searcher by aid of the alphabetical index is led to a simple decimal number, which he

finds in the Decimal-Reference Index subdivided and compounded to the minute detail which is required by the corresponding references of the work.

This subdivision and compounding is not only unnecessary in the alphabetical index, but would obviously be most confusing if scattered throughout the index under the alphabetical terms. In the Decimal-Reference Index, however, the subdivision and compound decimal numbers are listed in correct relative decimal order and therefore in the order of the classified concepts which they represent.

It is at once evident, then, that in the Decimal-Reference Index all related references are brought together irrespective of language, and the searcher, having selected the simple aspect of his subject from the alphabetical index, is faced in the Decimal-Reference Index with all the subdivisions in detail of that subject and all its combinations with or relations to other subjects concerning which information is to be found in the work. He is not likely, therefore, to miss the particular information he is seeking, even though its bibliographical definition is not clear to him.

Moreover, the Decimal-Reference Index is more than likely to bring before the notice of the searcher the existence of possibly useful information which previously had not been suggested to him.

In Appendix III a page of the Decimal-Reference Index to the British Power and Fuel Bulletin is reproduced, which will serve to illustrate the characteristics mentioned.

It will be noticed that all decimal numbers are immediately followed by a brief description of their meanings expressed by the same principal terms that appear in the alphabetical index. The references, if any, then follow. Thus in the Alphabetical Index we find :

Engines	
Diesel	621.436
Welding	
Electric arc	621.791.75

and in the Decimal-Reference Index :

621.436	Diesel engines.	I 191, 192, 238, etc.
621.791.75	Electric arc welding.	I 351, 530.

The references given under 621.436 deal with Diesel engines as such, but on running the eye down the list the simple subdivisions proper to Diesel engines will be found, thus :

621.436-142	Double-acting Diesels
621.436-185.4	High-speed Diesels
621.436.003	Diesels, economics
621.436.011	Mechanical studies, Diesels
	etc., etc.

and as all these are followed by references it is clear that information upon these subjects is contained in the Bulletin.

If now we turn back to 621.436, various compound numbers are seen to follow arranged in decimal sub-order.

The meaning of each compounded number is also indicated so that no confusion as to their implication can arise in the mind of the searcher.

Thus we find :

621.436 Diesel engines
: 621.43.038 Fuel injection I 40, 187, 261

and it is at once clear that the references quoted are concerned with *Fuel injection in Diesel engines* without having to ascertain the meaning of the number 621.43.038.

The significance of 621.43.038 could be found by turning to the place in the index where it occurs in decimal sequence, but when a number is followed by many such compound numbers, it is convenient to have the meanings of each specified. If, however, the searcher was interested in *Fuel injection*, he could find in the alphabetical index :

Injectors

Fuel

Intern. combustion engine 621.43.038

the relative terms fully defining the meaning of the first.

Turning to the Decimal-Reference Index, he then finds :

621.43.038 Fuel injection

under which as a general subject no references happen to appear, but compounded with

: 621.436 Diesel engines

and also : 621.436-185.4 High-speed Diesels

he finds the references.

It will be observed that in this way all compounded numbers are reversed and inserted in their correct decimal order in the index, and by this simple and purely mechanical process, carried out during the construction of the index, the searcher is led to the information he seeks no matter from what point of view he may envisage his subject.

It is sometimes necessary to express the information by three compounded decimal numbers, which are reversed and dealt with in the same way as two compounded numbers. An example of a triply compounded number may be seen at :

621.436 Diesel engines

: 621.541.1 Compressed air motors

: 625.282 Railway locomotives

The offsetting of the number 625.282 indicates that it is related to 621.541.1 in the same way that the offsetting of 621.541.1 indicates a relation with 621.436 and thus that all three numbers are related to one another. The interpretation of the compound number is simply a *Diesel-driven compressed-air locomotive*. There is no single division in the classification which corresponds to this triply compounded concept, which is a recent development in Mechanical Engineering and Railway and Road Engineering, two major divisions of knowledge that are indicated by the first three numbers of each of these decimals—*i.e.* :

621 Mechanical Engineering

and 625 Railway and Road Engineering

These main divisions are clearly shown in larger type in the Decimal-Reference Index, as at 621.5, 621.6, 621.7, 621.8, 629.9, 622 on the sample page, Appendix III. By emphasizing the major divisions in this way no confusion can arise as to the true meaning of the related and minor divisions to which by far the greater number of the references will correspond.

The method we have worked out of preparing the two indexes to the British Power and Fuel Bulletin is described in detail in Appendix IV. The procedure will be found to be of the greatest economy in operation.

It has been remarked that the cost of preparing the Alphabetical Subject-Decimal Index tends to disappear in a few years. Similarly the Decimal-Reference Index is cumulative in the sense that after a time the aggregate of divisions and compound divisions, which is formed as a framework for the information contained in the work, tends to reach an upper limit, and the chief additions that are made from year to year are simply the reference numbers themselves. Thus, if cards are prepared in the manner advised for the annual indexes, then the same cards may be used for the preparation of quinquennial or decennial indexes, avoiding mistakes and also any further expense in preparation. Moreover, if the type is kept standing, each successive index may be made to comprehend a period that depends on the bulk of references that it is economical to include, and the preparation and printing will involve, in the main, merely adding or changing reference numbers. In this way each index will serve for all the previous volumes within the given period, and the ordinary separate quinquennial or decennial indexes may be dispensed with.

It will be clear from the foregoing that the Alphabetical Subject-Decimal Index is essentially different from the ordinary alphabetical subject index usually appended to a volume. The index described could not be converted into an ordinary alphabetical index by adding the reference numbers to the alphabetical entries because—

- (i) these entries do not correspond to the extended notions described in the articles or abstracts, but only to the elements of these notions ;
- (ii) the fundamental principle of the new method is that the hidden classification with its double series of cross references from related terms and synonyms, which forms an integral part of the ordinary index, is replaced by a separate minutely classified systematic index.

The advantage of the Universal Decimal Classification for classifying scientific and other bibliographical publications has already been emphasized and is now being realised.

The system of indexing herein described is the natural method of preparing indexes to publications in which the articles, abstracts, or bibliographical references are classified by the Universal Decimal Classification, and the method gives the maximum of efficiency in service with the minimum of cost in production as compared with indexes of any other type.

In conclusion we desire to thank Colonel Sir Frederic L. Nathan, K.B.E., Editor of the Power and Fuel Bulletin of the British National

Committee of the World Power Conference, not only for the sympathetic interest with which he has followed the development of the Index to the British Power and Fuel Bulletin, but also for the many critical and useful suggestions he has made during the course of the work.

We also wish to thank Mr. E. Lancaster-Jones for his able criticism in the elaboration of the method and Miss M. Gosset and Miss R. Brown, on both of whose shoulders the main burden of the work of classifying the abstracts and compiling the index of the Bulletin has fallen.

APPENDIX I.

RULES FOR THE PREPARATION OF AN ALPHABETICAL SUBJECT INDEX TO THE UNIVERSAL DECIMAL CLASSIFICATION AND TO PUBLICATIONS INDEXED THEREBY.

The object of the rules is to facilitate the collaboration of a number of workers in the preparation of an index and the use of the indexes by the public. They are so framed as to reduce the personal equation and the number of entries.

1. Index entries should be made on 5in. by 3in. cards or slips, and not more than one entry with its decimal classification number should be written on a card.

2. The structure of an alphabetical subject index is the inverse of the classification, as it proceeds from the specific to the general.

3. An entry consists of certain terms, with the classification number directly in line with the last term. Thus :

Lighting	
Apparatus	628.94

4. An entry comprising one term is a simple entry. But entries will usually comprise two or more terms ; a specific term or heading, qualified by one or more relative or localising terms or subheadings. Such entries are called compound entries.

5. The subheadings of the same heading are not usually subdivisions of one class in the Decimal Classification ; they describe different aspects of the subject and relate to different divisions of the classification.

6. The part should not be indexed under the whole as :

Lighting	
Apparatus	
Electrical	621.32
Arc lamps	621.325
Incandescent lamps	621.326
Carbon filament	621.326.1
Gas-filled	621.326.72
Metal filament	621.326.2
etc.	etc.
or Analysis	
Chemistry	
Inorganic	
Qualitative	543.7

7. But the most specific term should be chosen as the heading as :

Lamps	
Arc	621.325
Lamps	
Gas-filled	621.326.72
Lamps	
Nernst	621.327.2
Analysis	
Qualitative	543.7

8. The entry should not be repeated with the terms reversed. Thus :

Boilers	<i>and not</i>	Steam engines
Steam engines		Boilers

9. Care is needed in the choice of subheadings. It frequently happens that a single group commonly expressed by a recognised term may, in fact, belong to several parts of the Classification. The relative terms must be selected so as to cover exactly the sections of the Classification that are being indexed.

Thus, for example, such a group as Electric lighting includes electrical apparatus 621.32 and the supply of current, which is dealt with quite properly in general electrotechnology 621.31, whilst the subject of illumination in general is treated in 628.9 and installation in buildings in 696.6. The index entries will eventually comprise such headings as :

Lighting			
Apparatus	.	.	628.94
Electrical	.	.	621.32
Electric Supply	.	.	621.31
Illum. eng.	.	.	628.9
Installation in Buildings			
Gas	.	.	696.2
Electrical	.	.	696.6

10. (a) Only one subheading will be necessary usually.

(b) When more than one subheading is needed, generally one term, or more, will be an adjectival or qualifying expression, when that which is most closely related to the heading, or which defines it most specifically, should take precedence Thus :

Coal	Temperature	Power
Cannel	Measurement	Hydraulic
Econ. geol.	Electrical	Utilisation

(c) If more than two subheadings, or three terms in all, are necessary, and this is unusual, they should be grouped in three lines. Such entries as :

Water	<i>may be</i>	Water
Analysis	<i>shortened to</i>	Total impurities
Chemistry		543.311
Impurities		
Total		543.311

11. (a) When it is difficult to decide which term of an entry is the more specific, alternative entries may be made. Such entries should be regarded as exceptional.

(b) Either concrete objects or processes may be more important according to the point of view, neither the one nor the other can invariably take precedence in an alphabetical index.

(c) Thus such concrete objects as machinery, products, goods, apparatus are of too generalised a nature to be indexed, while such processes as lighting, heating, refrigeration, selling, education, handling materials, mining, and transportation are subjects which must necessarily be included in a comprehensive scientific index.

(d) To help in deciding which term of an entry is the more specific, it may be considered which term would be likely to have the fewer subheadings. Thus in "Electric power generation," the last word would be chosen.

12. The terms of the entries should be taken, so far as possible, from the phraseology of the Decimal Classification Manual, but the index should include all customary synonymous terms also.

13. Any term of an entry may be either simple or compound—*i.e.*, composed of one word, or more than one word.

14. Capitals should be used only for the first word of a compound term, as Magneto-optical phenomena.

15. (a) The first word of the heading is called the catch-word.

(b) If the heading be simple it will be a substantive.

(c) In a compound heading, except when the substantive is too vague or general in meaning, or when a compound expression is universally recognised, the substantive should be chosen as the catch-word.

(d) Nouns like apparatus, equipment, efficiency, factor, measurement, and phenomena should be preceded by a qualifying expression, as "Load factor," "Surface measurement," "Magneto-optical phenomena," etc.

(e) Similarly, compound expressions in daily use as "Dark Rooms," "Röntgen rays," "Field-glasses," "Lighthouses" must be indexed under their first word.

16. The catch-words should be collective terms—*i.e.*, when there are a number of objects in the class indicated, the catch-word should be in the plural, thus :

Boilers
Vaccines

17. Conjunctive headings as "Iron and steel" should not be employed, but each part should be indexed separately. If the conjunction signifies relation, as in "Workmen and Employers," the relative aspect should be expressed by means of a subheading, *e.g.* :

Workmen
Relation to employers

18. Phrase headings should not be employed, prepositions should be avoided altogether, so far as possible, *e.g.* :

"Flow of fluids" should be indexed :

Flow
Hydrodynamics

19. Proper names of equipment and processes should be avoided unless they correspond to a class in the Classification, and, in general, terms that relate only to a part of the class to which the decimal number corresponds should be avoided. Thus "Britannic" would be indexed :

Ships
Motor

20. Redundant or understood components of a compound entry should be omitted. Only those qualifying terms should be employed that are necessary to express the specific idea represented by the entry. Thus "Lead sheath electric cables" would be arranged :

Cables
Electric
Lead sheath

when "Electric" is seen to be unnecessary, all Lead sheath cables being Electric cables. So the entry becomes :

Cables
Lead sheath

21. Analytical subdivisions should not be indexed separately. When they are used the compound number should be indexed as a whole.

22. Standard abbreviations of frequently-used main divisions of the Classification should be adopted—*e.g.*, "Chem. tech.," "Elec. eng."

APPENDIX II.

A SAMPLE PAGE OF THE ALPHABETICAL SUBJECT-DECIMAL INDEX

TAKEN FROM THE BRITISH POWER AND FUEL BULLETIN, VOL. I, 1931.

- | | |
|---|---|
| <p>Drying
Chem. tech. 66.047</p> <p>Dust
Chimney
Furnace 662.613.13
Separation from flue gases 662.964
Separation from mining products 622.794.7
By washing 622.794.1</p> <p>Dynamometers
Electric current 621.317.712
Torsion 621.317.788</p> <p>Economics
Power 658.26</p> <p>Economisers
Boiler 621.187.142</p> <p>Electric discharges
In rarefied gases 537.525</p> <p>Electric installations
Building construction 696.6</p> <p>Electrical measuring apparatus 621.317.7</p> <p>Electricity
Generation 621.311
Hydroelectric 621.311.21
Internal combustion engine 621.311.23
Steam 621.311.22</p> <p>Installations
Domestic 696.6</p> <p>Mechanical applications other than traction 621.34</p> <p>Physics 537</p> <p>Supply
Regional 621.311.1
Works 621.3.0062/3</p> <p>Electrification
Rail transport 621.331
Proposed 621.331.0012</p> <p>Electrodynamometers
Current 621.317.712</p> <p>Electro-precipitation
In gases
Chem. tech. 66.089.4</p> <p>Energy
Electric
Meters 621.317.78
Sources 620.91</p> <p>Engineering 62
Electrical 621.3
Mechanical 621</p> <p>Engines
Compressed air 621.541.1
Diesel 621.436
Gas 621.433
Heat 621.4
Internal combustion 621.43
Oil 621.436
Steam 621.1</p> | <p>Entropy 536.75</p> <p>Excavation
Mining 622.233</p> <p>Explosions
Chemistry 541.126</p> <p>Extraction
From gases
Of various products 66.074.3</p> <p>Farms 631.1</p> <p>Feed-water 621.187.1
Apparatus 621.187.13
Heating 621.187.14
Purification 621.187.12
Chemical 621.187.128
Electrical 621.187.127</p> <p>Fires
Domestic 662.91</p> <p>Flow
Gases 533.17</p> <p>Flue gases
Treatment 662.96</p> <p>Frequency
Alternating current 621.3.018.41
Measurement 621.317.361</p> <p>Frequency changers
Alternating current 621.314.26</p> <p>Fuel 662.62
Gaseous 662.76
Liquid 662.75
Pulverised 662.87
Smokeless 662.62 - 667.2
Solid 662.63/749</p> <p>Furnaces
Charging 66.042.1
Chem. tech. 66.041
Draught of 66.042.31
Electric 621.365
Fuel industry 662.9
Gas 662.95
Glass works 666.1.031
Induction 621.365.5
Oil 662.94
Pulverised fuel 662.933
With pulverising unit 662.933.11
Resistance 621.365.3
Solid fuel 662.936</p> <p>Fuses
Electric 621.316.923</p> <p>Gas
Blast furnace 662.769.1
Coal
Fuel 662.764
Industry 665.7
Coke-oven 662.764
Distribution 66.073.3
Furnace 662.613.5</p> |
|---|---|

APPENDIX III.

A SAMPLE PAGE OF THE DECIMAL-REFERENCE INDEX
TAKEN FROM THE BRITISH POWER AND FUEL BULLETIN, VOL. I, 1931.

DECIMAL-REFERENCE INDEX

- 621.43.013 Pneumatic studies
: 621.434 Petrol engines I 105
- 621.43.019.8 Antidetonation mechanism I 299, 742
- 621.43.038 Fuel injection
: 621.436 Diesel engines I 40, 187, 261
: 621.436—185.4 High speed Diesels I 431
- 621.43.044 Electrical ignition
: 621.431.73 Int. comb. eng. for road transport I 210
- 621.43.044.3 Coil ignition I 766
- 621.43.057.5 Antidetonants I 423, 667
: 547.258.19—211 Lead tetraethyl I 299
- 621.431.73 Engines for road vehicles
: 621.43.044 Electrical ignition I 210
: 629.113 Automobiles
 (02) Treatise I 318
: 662.75 Liquid fuel I 426
- 621.431.74 Marine engines I 37
: 621.436 Diesel engines I 263
 [621.181.621 Waste-heat boilers I 110
: 621.436.011 Diesels, mechanical studies I 324
- 621.431.75 Aero engines
: 662.75 Liquid fuel I 667
- 621.433 Gas engines I 260
- 621.434 Petrol engines
: 621.43.013 Pneumatic studies, int. comb. eng. I 105
- 621.436 Diesel engines I 191, 192, 238, 323, 682, 790, 793, 794, 795
(42) England
 " 1930 " I 39
(44) France I 186
: 621.311.23 Elec. generating stations, int. comb. eng. I 430
: 621.316.26 Elec. distribution substations I 428
: 621.43.038 Fuel injection I 40, 187, 261
: 621.431.74 Marine int. comb. eng. I 263
 [621.181.621 Waste-heat boilers I 110
: 621.541.1 Compressed air motors
: 625.282 Railway locomotives I 424
: 629.11 Road transport I 188, 321
: 662.75 Liquid fuel I 506
- 621.436—142 Double-acting Diesels Egypt
: 621—233.1 Crankshafts I 190
- 621.436—185.4 High speed Diesels Egypt
 I 41, 194, 253, 264, 628, 685, 686
: 621.43.038 Fuel injection I 193, 431
- 621.436.003 Diesels, economics I 111
 "1929/1930" I 254
- 621.436.011 Mechanical studies, Diesels
: 621.431.74 Marine engines I 324
- 621.436.016 Thermal studies, Diesels I 789
- 621.436.043.7 Compression ignition I 422
: 662.75 Liquid fuel I 741, 791
- 621.436.13 Two-stroke cycle Diesels I 109
- 621.5 PNEUMATIC MACHINERY
- 621.541.1 Compressed air motors
: 621.436 Diesel engines
: 625.282 Railway locomotives I 424
- 621.6 BLOWING AND PUMPING MACHINERY
- 621.643.2 Closed conduits
(02) Treatise I 619
: 621.17 Steam engine operation
: 539.319 Stresses I 622
- 621.646.4 Pressure regulators
: 665.7 Gas industry I 52, 123
- 621.7 FOUNDRIES AND TREATMENT OF METALS
- 621.788.8 Magnetic hardening of metals I 705
- 621.791.75 Electric arc welding I 351, 530
- 621.8 TRANSMISSION MACHINERY, HANDLING AND FIXING
- 621.83 Gearing I 42
- 621.852 Transmission belts
: 531.391.1 Movement of cords, Mechanics I 634
- 621.869 Handling plant
: 662.749 Coke I 136, 387
- 621.9 MACHINE TOOLS
: 621.252 Water transmission under pressure I 255
- 621.944 Rolling mills
: 621.3 Electrical engineering I 207, 707
- 622 MINING
(014) Nomenclature I 389
: 621.3 Electrical engineering I 55, 763
- 622.2 Mining methods
: 621.3 Electrical engineering I 208

APPENDIX IV.

THE PREPARATION OF INDEXES TO PUBLICATIONS

CLASSIFIED BY

THE UNIVERSAL DECIMAL CLASSIFICATION.

To index publications, and more especially periodicals and abstract journals, by means of the Universal Decimal Classification (U.D.C.), the first step is to determine from the U.D.C. tables, known as the Manual, the decimal number or numbers which represent the subject or subjects dealt with by each abstract or article. The classification numbers will be either (A) simple, or (B) compound—*i.e.*, composed of two or more numbers associated by a colon or other auxiliary sign.

A. SIMPLE CLASSIFICATION NUMBERS.

1. When the subject to be indexed is represented by a simple number, two cards are prepared, one for the alphabetico-decimal index and one for the decimal-reference index.

2. ALPHABETICO-DECIMAL CARDS. On this card is entered the class name in the Manual that represents the subject, followed in the same line by the corresponding decimal number. See Appendix A, Card A. The alphabetical entries should be prepared according to definite rules, such as those in Appendix I. If the title of the material indexed does not correspond with the class name, an additional card, or cards, should be made out bearing any necessary synonyms. On these cards the same decimal number should be entered. See Appendix A, Card B.

Note.—The introduction of synonyms is a matter of skilful interpretation of the user's requirements. It is preferable to omit terms that relate only to a part of the class to which the decimal number corresponds. If many references, however, are devoted to one part of a class, it may be worth while to apply to the British Society for International Bibliography for the establishment of that part as a sub-division of the class.

These alphabetico-decimal cards are kept in decimal order. As the work of indexing progresses it will be found that new material is already represented by the alphabetico-decimal cards and fresh cards will not be required. It will be found convenient to keep duplicates of these cards in alphabetical order as an index to the Manual.

3. DECIMAL-REFERENCE CARDS. On this card is entered the decimal number, followed by its meaning, if possible in the phraseology of the Classification. The number of the volume, abstract or page, or other means of finding the material indexed is added in the same line. This number is called the reference number. The decimal-reference cards are kept in a separate series and are also arranged in order of decimal numbers. See Appendix A, Card C. When the decimal number of new material is represented already on a card, it is sufficient to add the reference number of the new material to the card.

4. If the material indexed deals with more than one subject, each of which can be represented by a single decimal number, the procedure is as above, each decimal number having its separate alphabetico-decimal and decimal-reference cards.

B. COMPOUND CLASSIFICATION NUMBERS.

1. When the subject to be indexed is represented by a compound classification number, one alphabetico-decimal card should be made out for each of the separate decimal numbers, corresponding exactly to Appendix A, Card A.

2. The decimal-reference cards in such cases will always bear the compound decimal numbers, with their meanings, followed by the reference numbers. When there are two associated numbers, joined by a colon, two cards are required, on the second of which the decimal numbers are reversed. Should three classification numbers be combined, cards may be entered under each of the six possible combinations of the compound numbers. Each of these cards will bear its relative reference numbers. In such cases the second of two compound numbers, preceded by its colon, or sign of association, should be written on a second line indented two spaces and followed by its meaning. The same procedure applies to a third compound number. See Appendix A, Cards D and E.

3. If the first decimal number of a compound number does not occur by itself on a decimal-reference card, a card must be prepared bearing this number with its meaning. This card will have no reference numbers. See Appendix A, Card F.

C. PRINTED INDEX.

1. The alphabetic-decimal cards rearranged in alphabetical order constitute the alphabetic-decimal index to the volume and are printed as such. In subsequent volumes a selection is made from the accumulated alphabetic-decimal cards, again arranged in decimal order, of all those cards relating to the decimal numbers used in indexing the volume. This ensures that all synonyms will be included in the index.

2. The decimal-reference cards in decimal order are printed as the decimal-reference index.

3. The same cards will serve for the preparation of quinquennial and decennial indexes.

4. If a publication is international in scope and has sections in different languages, like the *Power and Fuel Bulletins*, the Alphabetical Subject-Decimal Index in any one language will give access through the various decimal-reference indexes to the abstracts, articles, etc., in all the different languages.

Contd. from p. 40]

PROFESSOR A. F. C. POLLARD (communicated) :

I much regret that I was unfortunately prevented from being present at the interesting discussion on the paper submitted by Dr. Bradford and myself.

From Dr. Bradford's reply, as also from the paper itself, it must be clear to Mr. Headicar and Mr. Besterman that the system of indexing experimentally tested with the *Power and Fuel Bulletin* and here described has been devised for application to periodical publications only, and after its initial elaboration the total cost becomes rapidly less for succeeding volumes.

We have investigated the question of cost in comparison with that of other indexes as far as available figures will permit, and find that the initial total cost appears to be less than that of the ordinary alphabetical index per thousand abstracts or articles. We are unable to publish figures because we were asked to regard as confidential the information given to us. With the usual alphabetical system the cost is repeated with minor variations in each volume, but with the system here described the cost of construction rapidly diminishes from the moment of its initial publication, and this fact is the outstanding feature of the system.

Careful analytic comparison with other indexes must be made before statements on the matter of cost can be accepted as reliable.

APPENDIX A. EXAMPLES.

A.

Grids

Electric distribution

621.316.1

B.

Networks

Electric distribution

621.316.1

C.

621.316.1 Grids

3,196

D.

547.562	Phenol	
: 668.731	Coal tar	4,227

E.

668.731	Coal Tar	
: 547.562	Phenol	4,227

F.

31 Statistics

DISCUSSION.

In opening the discussion MR. B. M. HEADICAR said that while he fully appreciated the theoretical perfection of the decimal classification and considered that an index on the lines laid down by Dr. Bradford was ideal, there were very serious physical drawbacks to its practical application, the chief of which was the heavy expense of production. The decimal index could not stand by itself for it needed an alphabetical index which would add considerably to the length. The ordinary user would always expect to find his subject under the familiar phrase or catch-word rather than under a decimal number. The necessity of looking first in the alphabetical index involved a double process of reference.

MR. H. V. HORTON said that the decimal index was useful in making subject indexes because it provided standard headings and sub-headings. When used for card-indexes, where abstracts were mounted on cards, it saved rewriting titles or making new titles, being especially valuable in this connection for foreign languages.

MR. H. L. ROBINSON said that the Dewey and the Universal Decimal Classifications were useless so far as Textiles were concerned. He had for many years used a scheme of his own which worked satisfactorily.

MR. THEODORE BESTERMAN said that the decimally classified index compared unfavourably with the ordinary alphabetical index as regards length and cost, accuracy in production, and facility for use. The index of the British Power and Fuel Bulletin, which was before the Conference, was thirty-two pages in length, but an ordinary alphabetical index for the same three hundred page volume should only occupy half that space. The whole index would have to be printed with additions in the successive annual volumes of the Bulletin, unless the main subject index were printed in the first volume only and the supplements in succeeding volumes, a tiresome process for reference. In times past it had been the fashion to print many indexes, or indexes in several parts, but it was the modern tendency to cut down their number. He noticed that the Power and Fuel Index consisted of several parts. The whole thing would thus be very expensive to produce. It was difficult to print a great many decimal figures with certain accuracy, as the page of corrigenda to the decimal numbers in the Power and Fuel Bulletin showed. Finally, the decimal index was not so quick to consult since you had to go first to the alphabetical subject index and your work of reference was thereby doubled. The systematic index undoubtedly possessed aesthetic attractions as a complete and logical scheme, but this could not make up for its practical disadvantages.

MR. FREEMAN HORN said that an index was not primarily intended for the ignoramus. A certain knowledge of the subject would first be obtained from a text-book. The decimal classification was not sufficiently elastic for the industrialist, though it might be suitable for the librarian.

MR. A. W. SWAN spoke on the merits of the decimal system.

MR. S. W. GIBSON emphasised the connection between indexing and filing, and said that for foreign languages the alphabetical index breaks down.

MR. J. F. POWNALL suggested that every printed abstract or article should bear the universal decimal classification number in order to familiarise the public with the system.

DR. P. S. HUDSON said that you could not expect the same degree of perfection in the general scheme as you might find in the separate parts, and that in order to share in the advantages of a uniform system some compromise might reasonably be expected.

MR. H. H. JOHNSON said that the lack of an English edition of the universal decimal classification detracted seriously from its value to industrialists over here. Scientific and trade bodies in this country must have help to draw up the scheme if it is to be accepted and used.

MR. B. M. HEADICAR pointed out that the universal decimal classification was the work of the Brussels Institute and constituted a revision of Dewey by librarians and scientific experts of various countries.

DR. S. C. BRADFORD said that he thought that an English edition would appear before long.

COLONEL L. NEWCOMBE spoke on the translation of terms.

MR. R. BRIGHTMAN said that one of the major practical difficulties in the adoption of the decimal classification by industry was that the classification had not yet been worked out in the detail necessary for the industrial specialist. This involved, in consequence, the expenditure of much more time by the staff of the industrial library or information bureau than was usually available, and it was probable that we could only expect the extension of the universal decimal classification

to industry, after it had been taken up by scientific journals and used much more widely for their abstracts and papers. At the same time, the industrial librarian must not forget that the information with which he was primarily concerned was only one branch of knowledge and that it had its relations with the general field of knowledge. In these points of contact the universal decimal classification had outstanding advantages and particularly as regards the arrangement of books on the shelves where enquirers might find the books arranged on a system already adopted in many reference and public libraries throughout the country. The lack of an English translation was not a serious obstacle.

MR. L. C. WHARTON, as a note to other speakers, pointed out that Soviet Russia decreed some years ago that all books should bear the universal decimal classification number. This has been dropped of late despite its use for the non-Russian books. The Ukrainian books give a reference to the Ukraine book list which gives the classification number as assigned by expert classifiers.

DR. BRADFORD, in replying to the discussion, said that the examples of alphabetical indexes chosen for criticism in his previous paper were the best he knew. In clearing up some of the difficulties that had been mentioned it would be helpful to realise, as one of the speakers had pointed out, that indexing was akin to filing. There were those who studied classification as an end in itself. He was concerned primarily with the labelling of information so that it could be found. Thus the logical perfection of the decimal classification was desirable, but not essential. It was a means, and the only existing one, of co-ordinating bibliographical work on all subjects in all languages. Actually we made as complete a test as possible of the subjects to be indexed, arranged them in a convenient order, denoted them by the simplest symbols universally recognised—i.e., decimal numbers, and provided an alphabetical index for the meanings of the symbols. The symbols could be combined to represent complex notions and these themselves were compounded of simpler concepts. But the alphabetical index to the classification bore no relation to the alphabetical system of indexing, because the former was not an index to the complex notions that formed the subjects of modern discussion, but only to the symbols used to represent the elements of those notions. And this index was devoid of cross-references, whereas the ordinary alphabetical index attempted to deal with the complex subjects themselves and had to be loaded with the complicated series of cross-references for synonyms and related terms which formed the imperfect concealed classification described in his paper. The index was not designed primarily for those who remembered the title of a particular paper but for finding the classification numbers under which are grouped all the references to a particular subject. Alphabetical entries prepared according to the rules given formed part of the index to the decimal classification. The rules were intended as a guide in overcoming the difficulties experienced in the compilation of such indexes, to co-ordinate the work of bibliographers, reduce the number of entries, and as a convenience to the users, who would soon discover the system of the indexes.

Those who considered the universal decimal classification unsuitable for industrial purposes should remember that it was in those branches of knowledge that the system had been most extensively employed and in which its use was extending most rapidly. The classification was employed by some of the largest industrial firms in the world, such as the Royal Dutch and the Skoda works and by many large technical periodicals. It was suitable for indexing any conceivable compound or alloy. In any subjects in which the sub-division was still insufficient, extensions would be obtained quickly by application to the British Society for International Bibliography.

The use of the decimal classification overcame all difficulties in indexing foreign literature. For example, the Japanese Power and Fuel Bulletin was indexed according to the same system as the British Bulletin, and the alphabetical index to the British Bulletin gave access, through the decimal numbers, to the abstracts in the Japanese Bulletin irrespective of the language of the original articles. The decimal numbers brought related subjects together and obviated the time-wasting system of cross-references necessary in the ordinary alphabetical index. The length of the index was not greater than that of indexes with which he had compared it. The Author Index to the Fuel Bulletin was no part of the system. The cost would be found to compare favourably with that of any other system. In a few years the preparation of the alphabetical index comprised merely the addition of a few new terms while that of the decimal index consisted in the main of the addition of new reference numbers to existing decimal entries.

[Contd. on p. 36]

The Establishment and Operation of an Information Service.

A REPORT EDITED BY ARTHUR F. RIDLEY, F.L.A., AND
B. FULLMAN, B.Sc., A.I.C.

(both of the British Non-Ferrous Metals Research Association).

NOTE BY EDITORS.

The following report originates thus :

Individual memoranda on the subject were submitted to the editors by the following :

MISS E. W. PARKER (The Mond Nickel Co., Ltd., Research and Development Department).

MR. E. J. CARTER, A.R.I.B.A. (The Royal Institute of British Architects).

MR. T. M. HERBERT, M.A., A.M.I.Mech.E. (London, Midland, and Scottish Railway).

MR. A. S. WINDETT, B.Sc. (Econ.) (formerly of the British Electrical and Allied Manufacturers' Association; now attached to the Imperial Economic Committee).

The above contributors proposed that the editors draw up a unified account of the subject, based on the data set out in the several memoranda, and incorporating such relevant contributions as could be made in regard to the editors' own Association. The editors gratefully acknowledge the full discretionary power given them by the other contributors in order that the report might be as clear and coherent as possible. Owing to the difficulty of fusing into an homogeneous whole memoranda dealing with differing types of experience, the editors have found it necessary to present as an individual account a digested result of a reading of the memoranda, rather than simply to connect the latter together. The editors and contributors are conscious that in a brief report like the present one, many important features of the work of a modern information service are necessarily omitted or obtain only passing reference. It is therefore offered only as a general survey of up-to-date practice and tendencies. In its present form the report has been submitted to all the above contributors, and where necessary modified to meet their criticism and suggestions, but the responsibility for it necessarily rests on the editors alone.

INTRODUCTORY.

It is now widely recognised that every organisation of considerable size must include some unit specifically devoted to the acquisition, and dissemination to everybody concerned, of all information which may seem of importance. Formerly this task was carried out (or more frequently neglected) by each member of the organisation for himself. Experience has, however, shown that the task of dealing with large masses of information lends itself just as advantageously to specialisation as do the innumerable other activities of organised society. An efficient information service, however small, can deal with a far greater body of knowledge than can possibly be handled by the haphazard methods, however energetic, of individuals to whom such a task is at best a sideline. The knowledge acquired, moreover, is not lost in the notebooks of individuals, but permanently stored, classified, and catalogued for the use of all members of the organisation; while the latter are left to concentrate on their own special tasks, free from the harassing fear (all too commonly felt, for example, by many researchers) that they may possibly be ignorant of some publication having vital bearing on their work.

It must be emphasised that the existence of an information service does not relieve the individuals in an organisation from the duty of reading and digesting all information of importance to their work : the value of the information service to the individual is rather that it is able, by special knowledge of his needs, to select and offer to him everything that bears on his work, thus rescuing him from the task (almost hopeless for any single person) of winnowing the wheat from the chaff in the enormous bulk of literature which is now published on every conceivable subject.

The remarkably divergent activities covered, for example, by the various contributors to the present paper show how widespread is the recognition of the value of an information department. It is safe to say that in every case a threatened abolition of the department, or decrease of its activities, would be resisted by workers in every branch of the organisation served by such a department. Indeed, the time has come when no organisation, whether governmental, professional, technical, or commercial, can possibly function with full efficiency without the aid of an information department ; and a careful investigation would probably show that a very large majority of successful organisations include such a department. The excellent results already achieved, often by departments seriously understaffed and working under adverse conditions, show that the wholesale development of information services, adequately staffed and financed, would have the most momentous results on national and international welfare and on technical and commercial progress.

SCOPE.

The scope of an information service depends on the nature of its clientèle and of their work. Even in a single organisation, the work of the department may cover a very large range. For example, one of the contributors to this report aims at covering all the more technical departments of a large railway company. Another deals with chemical, mechanical, electric, automobile, marine, telegraphic, and sanitary engineering, architecture, domestic and institutional hardware equipment, food handling plant, decorative hardware, jewellery, and the metallic materials, as such, apart from their applications. More than one is called upon to face a clientèle ranging from the general public to students and practitioners of a highly-technical profession, the information required ranging from the simplest ABC of the subject (for popular consumption) to highly-technical information required by the specialist. These cases are probably paralleled to some extent by many others.

The clientèle may be either active or passive, in the sense that it may be constantly and actively asking for information on definite subjects, or else expect primarily to be kept informed as to progress and development in certain fields of knowledge in which it is interested. Another two aspects from which the work of an information service may be viewed are the educative and the purely informative. The latter is obvious enough : whether the clientèle be active or passive, or both, as defined above, it is presupposed to take an interest in advances in knowledge. As regards the educative side, it may be pointed out that every organisation contains some members who are somewhat slow in making use of the facilities offered by their informa-

tion service. The reasons are various, ranging from mere inertia to resentment towards outsiders who have the temerity to offer information to a specialist. It is with this class that an information service may expect to achieve its greatest victories. The problem is in part a psychological one—that of arousing the interest or lulling the suspicions of the “hard cases”. This problem will be further discussed below.

One of the contributors to this report has also included the supply of information to the press among his activities. In part, this type of work is not different from the supply of information to the general public. It may, however, also involve the question of propaganda or publicity for a particular industry, group, or body. While this is a matter of the highest importance, we feel that a discussion of the special mechanism whereby an information service may be utilised for this purpose falls outside the scope of the present report. Although certain of the contributors to this paper are working in close co-operation with departments primarily responsible for propaganda, this aspect of the subject has been considered as extraneous to the present discussion and has been purposely omitted. It really demands a separate report in itself.

STAFF.

On the library side (see “Storage and Indexing” below), the services of one or more trained librarians are indispensable. The information service should equally include technically-trained officers able to assess accurately the value of the information received. Emphasis must be laid on the importance of a knowledge of foreign languages.

We draw special attention to the importance of careful choice of staff. A really “live” information service can only be created by a personnel with a special flair for scenting useful information in the most unexpected quarters, and for disseminating it in the most useful way. A large amount of the work is necessarily routine, but it must never be allowed to become too much so. In fact, a very real part of the business of an information service is to safeguard the organisation for which it works from becoming hidebound with tradition. In information work initiative is of high importance; and initiative cannot exist side by side with too slavish a subservience to routine. Attention has been drawn above to the importance of possessing a trained staff. It is thought in some quarters that an information service can be built up and worked by the use of card-indexes operated by office boys. Such an organisation can be made to produce a large volume of results on paper: but it never can and never will succeed in offering consistently the required exact information on a specific subject. Only a small proportion of special library and “intelligence” work can be performed to maximum efficiency by cheap labour, and experience indicates that money “saved” by the employment of low-salaried staff is rather “wasted” owing to the resultant loss of time and energy on the part of the senior staff and the troubles arising due to inaccurate work done by those whose training does not render them sufficiently appreciative of the importance of considerations involved, frequently in matters of detail.

One of the most important criteria of the efficiency of an information service is the shortness of the time-lag between the publication of information and the moment when it is brought to the notice of the individual who needs it. In fact, the information service is probably more concerned with the time factor than is any other part of most organisations. Efficiency in this sense depends to some extent on the ability of those who actually carry on the search for information : but in the last resort it is largely a matter of adequate library, technical, and clerical staff.

EQUIPMENT.

The equipment of an information service includes suitable library accommodation ; facilities for storage of books, pamphlets, etc., in a readily accessible manner ; provision of suitable indexes and catalogues, etc. Furnishing equipment must be decided entirely on the basis of work to be done, funds available, and accommodation for storage. Files, cards, paper, and heavier furnishing equipment are thus matters for individual selection dictated by individual requirements. A visit to library equipment firms will, as a rule, solve particular problems in this connection. Discussions with other workers in the same field are also a fruitful source of assistance, adding much to the easy working of information bureaux.

Brief reference may be made to mechanical equipment. Where highly-technical typing has to be done, a modified typewriter (*e.g.*, providing for special symbols, accents, etc.) will result in great economies of time. A duplicating machine is indispensable in any organisation in which lengthy communications must be rapidly circulated to numerous individuals. A photostat apparatus is still generally regarded as a luxury. In rapidity and accuracy of reproduction it is unrivalled, especially in material including diagrams, and it is a moot point whether the saving effected in dispensing with it is not more than lost in other ways (cost of reproduction of diagrams, etc.). In any case, every information department will need to have access to facilities for the rapid reproduction of all kinds of material, printed and otherwise. Where economic and statistical information is dealt with on any considerable scale, the use of calculating machines requires consideration.

ACQUISITION OF INFORMATION.

For acquisition of information, the information department depends in the main on published literature, scientific and technical. As many as possible of the journals which bear directly or indirectly on the affairs of the organisation should be received in the department ; there must be no language barriers and the department should endeavour to examine or, at the least, know about everything the world publishes on its subjects. Journals which are not available in the department should be surveyed in external libraries, such as the Patent Office Library and the libraries of the various scientific and technical societies and institutions. This external survey is carried out to some extent by all information departments, however wealthy and highly developed, since few organisations can possibly

subscribe to or acquire every journal which might concern them. It is important, however, that as many as possible of the journals which are of primary interest to the organisation should be received internally. Even in the best external libraries, the task of making such a survey is laborious to a degree. If it is lightened as much as possible by internal work, the surveying officer is left free to devote his time in external libraries to the examination of "border-line" journals. Those who have had experience of such work know that on occasions it produces a rich harvest of valuable information.

While the recording of actual published information is the main purpose of a survey of the periodicals, this survey also has a secondary purpose of very great importance. Intelligently carried out, it enables the information service to keep "ahead of the game". For example, it advises the surveying officer of forthcoming meetings: he should at once establish contact with the societies or other bodies concerned, with a view to obtaining preprints of papers to be read, or asking the authors for reprints when available.* Frequently also, a short note in a journal reveals the existence of an important paper emanating from an obscure source. The technical journals also enable the information department to keep abreast of trade literature. These are only a few hints thrown out at random. An experienced surveying officer, co-operating with an intelligent clerical staff, can, at one and the same time, survey his journals for information purposes and also requisition, during the course of his survey, much literature which will be available in the future, and which, but for the efforts of the officer, might remain out of sight for months after publication. For its efficient operation such work demands, on the part of the surveying officer, not merely a knowledge of the technicalities of his subject, but also a wide knowledge of scientific and technical personnel all over the world. Only those with experience of this type of work know how much valuable literature can be acquired early and gratis by a tactful approach to precisely the right person.

The time factor is, of course, of very great importance, though it can be, and sometimes is, overstressed; an organisation which is fed with information at too high a speed and pressure sometimes develops indigestion when the staff is insufficient to assimilate it. But it is obviously of great importance that all relevant literature should be brought to the attention of those concerned as soon after publication as is reasonably possible. The actual period which elapses depends on the amount of literature which is being published, on the availability of sufficient surveying and clerical staff to deal with it, and on various other factors. In one of the organisations contributing to this symposium, the greater part of relevant information is brought to those who need it within a week of publication. In another, a month is the period aimed at (with special supporting methods, described below). In at least one important manufacturing

* Apart from the major object of keeping in touch with technical experts for their own sakes for the discussion of specialist problems as they arise, the question of reprints is of great and mutual importance. The ideal aimed at by some services is to possess a reprint of every paper or article bearing on the work of the organisation, even where the paper is already possessed in a bound journal. Where such papers are required for consultation outside the library, the bound copy can be retained for internal use: while where the library operates through the post, the use of reprints results in large postal economies.

concern a *daily* bulletin of information is one of the features of the intelligence department's work.

At this point it is necessary to touch on the question of patent literature, though this is mainly of importance to organisations with commercial connections. In such cases, it is desirable that all patents—British, Imperial, and foreign—should be carefully watched. One of the memoranda contributed to us points out that the inter-relationship between technical and patent literature is so close that watertight separation of the two classes is undesirable; and that economy of time and effort in both literature and patent sections will be effected by close correlation of work on both. There is no doubt of the truth of this. On the other hand the volume of patent literature is enormous, its variety bewildering, and the method of its presentation very disorderly. Adequate survey of the patent literature of the world can only be superadded to the ordinary survey of literature if sufficient staff is provided. We here throw out the suggestion that an abstracting journal (weekly or thereabouts), devoted solely to the patent literature of the world, adequately indexed and divided into sections, by subjects, would be of enormous value. No doubt it would be a formidable undertaking, but it seems quite clear that sooner or later such a periodical must be published. Ordinary abstracting journals are always far too slow for such work, in which delay may have very serious financial consequences. Moreover, patent regulations are so intricate, and vary so much from country to country, that a special staff is needed to handle the matter properly.

The question of the acquisition of information should not be left without brief reference to those processes of securing information which are not immediately concerned with the utilisation of published and unpublished literature and reports, but which are rather devoted to the organisation of material other than literary. The methods of questionnaire, of development of personal contacts, utilisation of the knowledge and experience of specialist staff, judicious selection of staff for membership of learned and technical societies and foreign visits of investigation are examples of methods within this category which will be employed from time to time by the alert information service.

STORAGE, CLASSIFICATION, AND INDEXING OF INFORMATION.

The method of storage of the literature utilised by an information service depends on the nature of the library service (open access or not), on space available and on financial considerations. The matter is fundamentally one purely of library technique.

The questions of classification and indexing in relation to the work of information bureaux are still the subject of hot debate. It is urged by many that great advantages would accrue from the adoption of some universal system. Whatever the relative merits of the various methods which have been adopted by various librarians, the chances are that for some time to come each information bureau will use the method which it considers most convenient for its own purpose. The main point at issue for practical purposes is not necessarily classification in an ideal universal manner, but classification such that any desired information can be unearthed with all reasonable speed.

In any case, it is of importance that indexing or cataloguing should be carried out as speedily and completely as possible. The method of indexing partly depends, of course, on whether the index is to be used by an expert library staff or by any user of the library. Assuming that it is to cover both these needs, it should be as thorough and "foolproof" as possible, with amply sufficient cross references. (No two people approach every subject in an index from the same point of view, nor ever will.) Finally, an indexer should always work in co-operation with a technically-trained officer, in order that the index should be reasonably satisfactory from the points of view of both librarians and technicians.

Apart from an index of the literature actually in the possession of the department, it is desirable that there should also be an index covering the whole of the literature of the subject, with indications of the places where it may be consulted. Probably the best way would be to combine the two indexes to form a repertory of information on the subjects with which a particular service is concerned.

PRESENTATION AND DISSEMINATION.

From the broadest possible point of view, the general information collected by the service may be required for presentation (*a*) to the internal staff of an organisation, (*b*) rather more widely to various external members, and possible (*c*) to an even wider public.

BULLETINS, ETC.—For internal purposes, a highly-efficient method described in one of our memoranda is a system of weekly General Reference Sheets, whereby information on all material made available during any one week is mailed to the recipients on the Tuesday of the following week. These General Reference Sheets contain particulars of Title of Paper, Author(s), Location, and, in cases where the title of the paper does not convey complete information as to the scope of the material contained, a brief note giving further details on this point. This is an almost ideal method, but it can only be carried out satisfactorily in a comparatively large and highly-developed organisation. Less elaborate methods, suitable for smaller organisations, will suggest themselves from the other notes which appear in this section.

Another method which is commonly adopted for both internal and external purposes is the production of a monthly bulletin (printed or mimeographed), backed up by special service for more urgent matters (see information circulars, below). The form of presentation of the information varies with each organisation. In some cases it consists of a brief note on each paper mentioned, giving the salient points in the fewest possible words. In others an attempt is made to present a readable summary of the original and not a mere catalogue of contents. For example, one of our memoranda mentions abstracts of length 150–200 words. A further point is the completeness of the bulletin. Some organisations include every item which comes into their possession; others act selectively, including only the more important matter, the rest being reserved for indexing in the library.

The methods adopted depend on the nature of the public served and on other considerations. As to the value of including in bulletins very brief explanatory notes, two of the contributors to this paper find that in their own organisations the adoption of this method has

led to a much increased demand for literature on loan through the post. But it is impossible to dogmatise on such a subject. Each information department must study its own public and develop its own technique from experience.

The bulletin alone cannot provide its readers with all the information they require. It can only inform them of the publication of the information, and possibly give an abstract. The information service should urge members of its organisation to consult the originals, and it is therefore necessary that the bulletin should be backed up by good library service. Efforts should be made to supply all items demanded as promptly as possible, even where they must be obtained externally.

INFORMATION CIRCULARS.—A monthly bulletin, efficiently managed, can keep quite closely up to date (it is feasible to aim at presenting literature in the bulletin within an average period of a month from publication). But for very urgent matters some supplement is necessary. What is required is some routine method of supplying urgent information to the individual concerned at once. One of the organisations above-mentioned solves this problem by a system of information circulars, the routine operation of which is carried on simultaneously with the survey of literature for bulletin purposes. Any material which in the opinion of the information officer (in co-operation with other officers) is of such outstanding importance as to justify the action is communicated at once to those concerned, either as a brief note or as an abstract, depending on circumstances.

It is obvious that this system can only be operated if the members of the information department have a sound knowledge of the needs of their various "customers". This point requires emphasis. An information department gains greatly by possession of such knowledge. It may be acquired in various ways: directly by conversation or enquiry, indirectly by watching the sort of literature for which a particular individual asks, and in other ways. In a large organisation the maintenance of a record of the special interests of individual members of the department's clientèle provides a valuable tool.

RELATIONSHIP OF BULLETINS AND ABSTRACT JOURNALS.—The relation of a monthly bulletin to existing abstracts journals is worthy of discussion. In the case of an organisation which covers a number of fields, far beyond the bounds of any single abstract journal, it is obvious that the monthly bulletin which combines and classifies the sum total of information is greatly economising the time of its readers. In the case of a bulletin covering a field which is already largely or entirely covered by an existing abstract journal, it must be remembered that in general the bulletin is highly selective, mentioning not everything, but only the things of importance. Moreover, an abstract journal giving full abstracts cannot possibly be so up to date as a monthly bulletin. This is really the strong argument in favour of brief notes as against long abstracts: it permits of the production of a bulletin which keeps the reader very much more closely up to date than is the case with a conventional abstract journal. The latter is still indispensable for consultation by those who wish to avoid reading lengthy originals, and, of course, for the general scientific public.

ENQUIRIES.—A considerable part of the work of an information department consists in answering enquiries either verbally (telephone) or by letter. In the case of telephone enquiries it is important that the departmental telephone should be in the hands of an intelligent operator who knows which member of the department is likely to be able to answer the question most efficiently. This point is too frequently overlooked. It is surprising that far too many commercial organisations (some of very large size) have not yet learned the importance of switching enquiries to a central information bureau.

Enquiries by letter should always be dealt with systematically and recorded centrally. In some cases the adoption of some simple form permits the information bureau to circulate the enquiry rapidly to a number of specialists in the organisation, so that the greatest possible measure of knowledge and experience can be brought into play. This applies to enquiries which cannot be answered merely by reference to the literature (and in our experience forms a large proportion of the total number of enquiries). Answers to enquiries should be carefully indexed to avoid the labour entailed in unearthing an answer to the same question twice over.

In some organisations, all enquiries are necessarily confidential. In others, publicity is not objectionable, and in such cases enquiries and answers may be published externally. The Building Research Station and other organisations publish such matters regularly in their journals and in the technical press; such information is of enormous value to those interested in the subjects.

TRANSLATIONS.—In view of the large number of foreign periodicals which undergo inspection, the question of the production of translations of foreign articles is of great importance. There is probably no limit to the amount of useful translating work which can be done, but it occupies a great deal of time, is costly, and is limited by availability of personnel. A good deal can be done by enlisting the services of members of the organisation outside the information department. They often produce translations of articles of special interest to them, and in many cases are willing, if approached on the matter, that there should be a standing instruction that copies of the translation should be passed at discretion to the information section, so that they can be filed for reference and if necessary reproduced for general circulation. We draw attention at this point to the remarkable fact that, in spite of the importance which is increasingly laid on a knowledge of languages, the proportion of technicians who can read a German or French periodical comfortably is surprisingly small.

PUBLICATIONS.—The information service in many cases also edits or prepares the general publications of the organisation. These may include, apart from those mentioned above, reports from various departments (research, development, etc.), reprints of important papers, and so on.

CONCLUSION.

We have outlined above, in very general terms, some of the methods which have been adopted for the operation of an information service. We have studiously refrained from seeming dogmatic on any point.

An information service must be a sensitive and flexible organisation. In organising one, it is wise to study those already existing, in order to learn from past errors. But in a large degree each information service is a law unto itself. In building it up, the information officer must consider the needs of his special public, and evolve a service which will fulfil those needs as adequately as possible.

DISCUSSION.

MISS E. W. PARKER said: The librarian or technical information officer disseminating information to "internal" staff is possessed of two initial assets, as compared with the officer catering for an outside public:

- (1) His clients may be presupposed to be keenly receptive.
- (2) Their specialist knowledge makes it possible for information to be presented in a form which is relatively close to the original, and which, in this respect, requires comparatively little preparation on the part of the librarian.

The trained "internal" staff, on the other hand, demands a very high standard of technical accuracy and, in many cases, a comprehensive, detailed, and discriminating presentation which can to some extent be waived in dealing with a general and semi-lay public.

The establishment and maintenance of co-operation and good will between technical and library staffs must be ranked as a factor of primary importance in the successful working of an information department. An intimate knowledge of the interests of the technical staff may also be facilitated by various organisational methods. An information service evolved by a Research and Development Department, and found to be adaptable to small and large-scale operation, comprises the following features: (1) Issue of a Weekly General Reference Sheet giving skeleton details of important technical and patent publications made available during the preceding week. (Recipients of the General Reference Sheet may requisition from the technical information section originals, abstracts, or translations of any items referred to on the sheets.) (2) Distribution of Annotated Bibliographies presenting a survey of literature on selected subjects. (3) Issue of Miscellaneous Information in various forms in reply to enquiries arising in the run of work. (4) Preparation and maintenance of classified Card Indexes for reference consultation in the Central Office and in outlier stations. Such a scheme may be worked, if desired, with only a small internal library, the greater part of the searching being carried out at external sources. Research reports and other forms of unpublished material, combined with selected text-books and journals, form a nucleus of immediately available information, while a series of carefully-correlated abstracts and bibliographies give access to the salient features of other published information and a direction to original literature which may be borrowed from outside sources.

Close collaboration between departments dealing with "internal" and "external" dissemination is economically desirable, since material prepared for internal presentation may in many cases be suitably modified for "external" publication.

MR. E. J. CARTER said: The section of this symposium which it is my duty to present to you has been honoured, or perhaps abused, with one of the most dissonant titles I have ever come across, and I have spent some time in attempting to devise another phrase than *Presentation and dissemination* and another definition of our objective than *external clientele*, but with no great success. I think, however, that if I cannot simplify I should elaborate to define more exactly what we mean by an external clientele before entering on my subject, which will, I hope, in itself be an explanation of what is meant by *presentation and dissemination*. An external clientele is to an internal clientele as a gas to the solid from which it is derived, volatile, diffuse, more subject to the domination of passing breezes, intangible and often suffocating, and inevitably intermingled with foreign bodies. This may sound impolite, but it is not meant so. The difference—to come to a definite example—is clear enough if we compare, for example, Miss Parker's clientele and my own at the Royal Institute of British Architects. Miss Parker is concerned with minutiae of detail within one sphere of interest. The Royal Institute of British Architects is necessarily as wide as architecture itself, and has the same dangers of divided interest and inability to deal in any adequate way with the amazingly wide range of information demanded from it. The result quite properly

is that a system of departmentalisation is developing which if properly organised should result in much greater efficiency. On one side is the Building Research Station, which by its organisation deals more efficiently than any purely professional organisation with the science of architecture—building. On the other, the newly-established Building Centre, which deals directly with the public by exhibiting the building materials provided by the trade. There remains to the Royal Institute of British Architects the vast sphere of the historical side of architectural æsthetics and architectural precedent, as they effect the practising architect or provide the subjects of research by the literary students writing books. School students demand the services of a large loan library of text-books, and in the background there is the great body of the general public, quite uninformed technically, who either come direct to us for information or who, as clients of our members, make their enquiries indirectly. There are many other bodies who have as wide a clientele. Every public library, for instance, is an information bureau for a general public.

Now, though it may be trespassing out of my domain, I will speak for a moment about equipment. Within the library must be a full range of the large works of reference. Of course, all the specialist dictionaries—I mean such works as the Dictionary of National Biography, the Oxford English Dictionary, the Encyclopedia Britannica, and the Victoria County History. And a close liaison must be established between every institution likely to be of service at any time. A register should be kept of such sources—of the names of their officials, their times of opening, the scope of their libraries and their publications. For architecture the Royal Institute of British Architecture has to establish such connections with, above all, the Building Research Station and the Building Centre, with the other art and architectural libraries, with engineers, surveyors, archæologists, historical societies, library organisations, and the allied trade and professional organisations. When it is realised that under each of the above headings there may be anything up to twenty institutions in London alone, this liaison work is seen to be of considerable importance, and though it is, as it were, part of the external equipment of a bureau (a subject about which I have no mandate) it is also part of the actual dissemination of the information contained in one's own concern.

Now I will attempt, in the limited time at my disposal, to deal more explicitly with a number of the instruments of presentation. First I must deal with the actual library service, and I have one thing to say which I feel of importance, namely this—that if the library itself is an information bureau it is of the utmost importance that the reference collection should not be depleted to supply the loan. In the reference there should ideally be at least one copy of every book, the loan being stocked from duplicates. The reference section should be on open access. Both index and books should be classified and the index should be a combined one dealing with every source in the library, so that time may not be wasted by readers or staff having to search through several separate indices. The personal enquiries made over the telephone or by visit must be recorded. At least, a record kept of the fact that an enquiry was made as a check on the use made of the library. It is generally impossible to write down fully, especially for a small and busy staff, the substance of verbal enquiries and answers, but an attempt should be made to record sources whenever a search has been made. A standard form—the actual form can be designed by each librarian to suit his own service—is useful for keeping the records. At the Royal Institute of British Architects one form is in use both for the MSS. record of information given and typewritten answers, and on it, too, are pasted press cuttings and other extracted matter. All is filed vertically in a Roneo cabinet, so that an accumulating file of all information apart from that in books is in the process of formation.

Now I come to the part of information bureau work where a very distinct difference comes in between the work for internal and external clientele.

Publications.—Whereas an internal clientele is naturally receptive and is, on the whole, reasonably well informed in the subject with which it deals, an external clientele is not. The average architect and the average builder or the average architectural student, and certainly the average client, is not receptive to new ideas or able to appreciate all the problems concerned with, for instance, new materials. Consequently he has to be drawn to make use of the facilities provided for him by definite propaganda. In its broadest aspects this may mean advertising pure and simple. None of us, even the librarians of our so-called learned societies, can afford to adopt the attitude of cloistered aloofness that still seems possible in some University Libraries. We must go out and sell our wares. The Building Centre puts advertisements in the daily press. I don't know that the Building Research Station has done any advertising, but I know that in the Royal Institute

of British Architects we do all we can to draw attention to ourselves! In a paper which Mr. Lamb, of Sheffield, is to read to-morrow he says a library only really deserves the name if it establishes an active contact with its readers. The active contact implies an effort on the librarian's part to meet his public, but, as Mr. Lamb also adds, the only effective contact is that provided by efficient service.

MR. T. M. HERBERT said: As an engineer, I am afraid I have very little right to contribute to this symposium, or to venture to speak this morning on a subject in which I am a complete amateur. You must, however, blame Mr. Ridley for my presence here, since I suspect it was he who was responsible for your secretary inviting me to take part in this session. My only possible justification is that I am concerned with a very young and very simple information service, very different in size and perhaps in aims from those represented by my collaborators.

You will remember that Bacon in his "New Atlantis," when describing the employments and offices in Solomon's house refers first to what he calls the "Merchants of Light," whose duty it was "to sail into foreign countries to bring back the books and abstracts and patterns of experiments of all other parts," and then to another class of person—termed the "compilers"—who had "to draw the experiments into titles and tables, to give the better light for the drawing of observations and axioms out of them." Some of those who are operating information departments can legitimately confine themselves to being "Merchants of Light"; they can devote themselves to the collection of information and their active clientele can be relied upon to utilise unaided the data they amass. Others, and I class myself among them, must be "compilers" also. They have to utilise the raw material collected both by themselves and by others, and pre-digest it before placing it in front of the ultimate users.

Our own information service, which is entirely devoted to the technical or scientific side of the Railway Company's interests, was originated eighteen months ago at the suggestion of an Advisory Committee on Scientific Research. The main object which we then had in view was to make known and popularise among our engineering staff the results of external research work, suggesting where possible its bearing on railway problems. We did not attempt in any way to cover the whole field of railway engineering, but merely to cover the outer fringe where engineering and the purer sciences meet and where new materials and new developments are born. Formerly our technical officers had practically no contact with the vast output of published matter in this field. There was no channel for the regular dissemination of results such as those coming from the various D.S.I.R. stations and from the Research Associations to which we subscribe. When I started I had, therefore, a well-defined and quite virgin field. This enabled me to adopt simple measures and dispense with the need for an elaborate organisation, since I hoped to operate very largely by utilising existing sources. I had also a clientele of a type even more passive than is indicated in the foregoing definition. It was essential to stimulate interest and build up confidence without arousing suspicion. It was decided to start by circulating monthly a Review or Bulletin to some two hundred members of the engineering staff, and it was agreed, wisely I think, that the Review should be sent wherever possible to each individual personally, rather than through official channels *via* the five or six heads of departments. I think the insistence on such a procedure is a point of some importance in establishing contact and confidence in the user.

The Review at present consists of some twenty foolscap sheets each month, and contains (a) abstracts from technical and scientific periodicals, (b) reviews of books, and (c) reviews of reports issued by research and other organisations. I find I am able to loan about ninety per cent. of the originals on demand, and I have been favourably surprised by the demand for these. Prompt response to requests for loans is another potent factor in building up confidence. Judging from the nature of these requests, I have come to two definite conclusions regarding the users' reactions. Firstly, quality rather than quantity appeals to a clientele such as mine. Any items ultimately included in the Review must be carefully selected with a knowledge of the users' interests. The mere collection and circulation of titles to published work, however accurate and exhaustive, makes no appeal to a clientele of what are called practical engineers, though the case of a scientific clientele engaged in laboratory research is doubtless different. Secondly, to ensure the utilisation of a piece of information, it must be attractively advertised.

I regard an abstract as I regard a book review; it should tell me what the article is about and it should make me want to read it. Therefore, I regard the wording of an abstract as of great importance; it must render it readable and interesting. I consider a length of 150–200 words is the ideal to aim at, and I

feel that judicious paragraphing is an inducement to the reader. I am a necessarily wide user of abstracts and abstract services, and I would make an appeal for a higher standard of readability. The writing of a good abstract is a highly-specialised and not easy literary exercise.

I hope I have not strayed too far from the remit given me by Mr. Ridley to speak mainly on utilisation. I have tried to emphasise the need for an understanding of the users' peculiarities. It is only by so doing that there is any guarantee that the material collected and circulated is utilised. This is particularly important, I think, in starting an information service.

I hope these few remarks may in some measure amplify the main paper, and particularly help to induce others connected with industrial organisations to start simple information departments of their own. With adequate enthusiasm it is surprising what can be done at a very low cost if existing services and sources are used to the full, and if one is at first content with the modest role of a "compiler" to give "better light for the drawing of observations and axioms out of" published information.

MR. R. BRIGHTMAN suggested that a discussion of such fundamental importance to ASLIB merited fuller treatment than was possible at the time of the meeting after hearing these several contributions. He proposed that it should be brought up at a future conference and that, in order to enable practical decisions to be reached on definite points, the discussion might well be concerned with specific aspects of the establishment or operation of information bureaux with the object of leading to definite proposals for co-operation or exchange of experience.

MR. B. M. HEADICAR referred Mr. Herbert to previous ASLIB reports for articles to help beginners and stated that, in his opinion, a proper training was necessary for people who were about to take charge of an information department. He also suggested that a definite name was wanted for intelligence departments, information bureaux, etc.

MR. P. C. BURSILL supported Mr. Brightman's suggestion, asking that the emphasis be placed on starting new bureaux.

DR. R. E. STRADLING suggested that members should be willing to allow visitors to see their services, and extended an invitation to visit his own (Building Research Station). In his opinion, the first essential was to find the right man, training being a secondary consideration.

MR. E. N. SIMONS, in reply to MR. HEADICAR, said that if we waited for firms to appoint a trained person in charge of the intelligence service it would never be started at all. The service often began by some person seeing the need for it supplying that need as a side line and later being told he could "have a whack" at organising an intelligence service himself. Moreover, an untrained person did in many cases make a very good job of it. When there was no money to spare the system must be worked with existing facilities.

DR. A. P. THURSTON asked if we might have some system whereby manufacturers could have the benefit of the information being collected. He thought that an exchange system should be developed.

On the motion of MR. R. BRIGHTMAN, seconded by DR. A. P. THURSTON, the following resolution was passed:

"It is desirable that further facilities should be given at the next Annual Conference of ASLIB for the discussion of the establishment and operation of information services, and, further, that such discussion should be concerned with specific aspects of the operation of such services, and more particularly with the possibilities of co-operation in the exchange and pooling of information and knowledge."

History and Sources of Official Vital Statistics.

By PROFESSOR M. GREENWOOD, D.Sc., F.R.C.P., F.R.S.

The primary object of this Association is :—

To examine, foster, and co-ordinate the activities of research organisations, special libraries, information bureaux, and similar services. When one reflects on the millions of recorded doings and sufferings, the actions, the thoughts, and the dreams of mankind, which this programme envisages, it is clear that the *statistical* record of births, marriages, and deaths can be but a very small drop in the vast tide of information which you seek to direct into appropriate channels. You must attend to so many things that for me to direct your attention to the doings of a London tradesman who has been in his grave more than 250 years or even to those of a simple-minded doctor who has been dead fifty years, must seem unreasonable. The Reports of the Registrar-General of England and Wales of the last fifty years fill many portly volumes, other nations now publish even bulkier vital-statistical returns. It would require several lectures to enumerate the contents of current publications; what purpose can there be in entering into the archaeology of the subject? Few efficient doctors know more of Galen than his name; most competent lawyers know less of *stillicide* and *emphyteusis* than R. L. Stevenson who at least knew that the one was not a crime and the other not a disease.

One reason for beginning with the archaeology of the subject is that in vital statistics, perhaps more than any other human activity, those who provided the materials had no prevision of the use to which they might be put; in some cases, indeed, would not have provided the material had they been able to foresee the consequences. Further, just as Walter Bagehot pointed out that in a modern democracy men and women contemporaries and citizens of the same state, may differ in culture by thousands of years, one finds that the vital-statistical data available in different parts of the world are hundreds of years asunder in respect of accuracy and refinement of method. There are many countries in which the application of such "primitive" methods as John Graunt adopted in the seventeenth century would yield valuable and urgently-needed information, and any attempt to introduce the vital-statistical system of England and Wales would be a costly failure. Hence ancient statistical history is never mere archaeology.

English medical statistics had their origin in selfish fear. In the reign of Henry VIII it was thought (quite correctly) that the best way to escape death from the plague was to leave a town in which plague had broken out, to fly into clean air. That the King's Highness might know when plague *had* broken out, order was taken that burials in London of those dead of the plague should be reported to the King's Council; the first bill of mortality, as such a report came to be called, was prepared in 1532; for some time the bills served no other purpose and were only prepared at irregular intervals, but,

by Elizabeth's time, the parish clerks of London had got accustomed to the work and by 1629 a regular system of weekly and annual bills recording christenings and burials in all the parishes of London, and assigning the causes of deaths, was in operation. In these records ages were not stated and the sexes were only distinguished for the totals. These were the data available to John Graunt in 1662. Physicians had regarded them with a lofty contempt; the causes of death as printed were the opinions formed by sundry ancient matrons, the sworn searchers, who may well have had some resemblance to Mrs. Sarah Gamp. One could hardly have expected a dignified Fellow of the College of Physicians to condescend to such trash. John Graunt was just a London draper by status, and a genius by nature. It occurred to him that something might be made out of these "poor despised bills of mortality," and in 1662 he published the first edition of a little book which is one of the classics of statistical science. (1) In that book Graunt first demonstrated the high rate of mortality in infancy, the higher rate of mortality in town than country, the excess of male births, and the subsequent equalisation of the numbers of the sexes by the higher post-natal rate of mortality on males. He first described the principle of what is now called a life table, and prepared such a table. He first properly distinguished between words and things, and cautioned the student against supposing that because new names of diseases are found in statistical reports, the diseases themselves must necessarily be new. He first laid down intelligent rules for reaching an approximate estimate of the population when no direct count of the individuals composing it was available. Some of Graunt's conclusions were wrong, but anybody who has read his book intelligently is a good deal better equipped for obtaining statistical information in a barbarous or semi-civilised country than the perusal of a treatise on the mathematical theory of probability alone would make him.

The direct influence of Graunt's work on medical men and civil servants in England was slight; we often do not appreciate our men of genius until "foreigners" have taught us better. Many people attribute to a Prussian Army chaplain, Johann Peter Süßmilch, the foundation of modern medical statistics. Süßmilch had little of Graunt's originality, but Graunt's work stimulated him to do, on a much larger scale, the easier part of the Englishman's work; he compiled records of christenings and burials for a wide area of Europe, and the book he published was extensively read. Among its readers was Thomas Robert Malthus.

Malthus, better known to book lovers as Mr. Fax in Peacock's *Melincourt* than from his own writings, was not primarily a statistician. In the first edition of his famous essay there are no statistics at all. But, become famous through the success of the essay in its original form, he changed it by the infusion of statistical data until, in the form familiar to most of us, it might not unfairly be called a statistical document. Malthus learned his vital statistics mainly from Süßmilch's book, which, we have seen, was inspired by Graunt. The direct and indirect influence of Malthus was potent in the events which led up to the foundation of the Statistical Society, the centenary of which is to be celebrated in two years, and the establishment of the General Register Office.

For the vital statistics of England and Wales between Graunt's time and 1837, the available data differ little from those Graunt had—*viz.*, the London Bills of Mortality and the various parish registers of christening, marriages, and burials. At the middle of the eighteenth century a collection of the London Bills was edited by Corbyn Morris, and about the same time Dr. Thomas Short published an essay which contains many curious calculations based on parish registers. In the latter half of the century Price and others speculated on population questions. The modern student who wishes to collate these data should read the late Dr. Brownlee's papers (2), the late Professor Gonner's essay (3), and the books of Mr. Griffith (4), and Miss Buer (5).

The subject of health and mortality in pre-registration times is one upon which librarians are, I think, not infrequently consulted because history is, even among amateurs, no longer an affair of political and military chronicles or anecdotage. Under the article of vital statistics, I think that, in addition to the works I have cited above, the serious student should be advised to read those papers of Farr in the memorial volume (6) which treat of past events and the introductions to the Handbooks in the League of Nations series (7).

With the establishment of the General Register Office, in 1837, a new vital statistical era began. Most of the credit for this belongs to the remarkable man who, in 1839, was appointed to a subordinate office in the new department, William Farr, born in 1807, died in 1883. Contemporary with Farr, both in this country and abroad, were several men of possibly as great intellectual powers and certainly much more proficient in the branches of mathematical science which are now universally regarded as an essential part of a statistician's equipment. Farr, however, was endowed with an intuitive faculty for divining the human realities behind an arithmetical statement, while a certain child-like simplicity—which in some of the practical relations of life landed him in financial difficulties—encouraged him to undertake and carry to a successful issue a task which more critically-minded men might have refused. The information transmitted to the General Register Office under the Births, Marriages, and Deaths Registration Act of 1836 consisted (and still consists) of statements respecting the circumstances of births, marriages, and deaths made by persons presumed to be familiar with them. So far as the particulars of the unqualified happenings, the actual occurrences, are concerned, no fundamental difficulty arises. There will naturally be a larger or smaller number of births and of deaths which are not registered at all; under the original Act registration was compulsory, but no penalty for disobedience was prescribed (the law was not amended in this respect until 1874). But the English are a law-abiding people and it has been estimated that, even in the early days, ninety-five per cent. of the births were actually registered. The percentage of deaths which escaped official notice would be smaller. The particulars respecting these occurrences which are matters of simple fact, the names of the parents of a child, the age and occupation of a deceased person, the places where the event occurred, are again items of information which, from the beginning of the system, would be likely to be recorded with reasonable accuracy. A more sceptical person than Farr would not have hesitated to use these data and, of course, from these alone many extremely important conclusions

can be drawn. But Farr wished to tabulate and analyse rates of mortality, not only by sex, age, and residence, but also by *cause* of death. A relatively small percentage of these deaths will have occurred under circumstances which preclude the expression of any valuable scientific opinion at all, no medically-trained person may have attended the patient, and the signs and symptoms attending the death and capable of being noted by a non-medical person may have been ambiguous. Even if we agree to disregard this not large fraction of the total, it will remain true that not only are the precise causes of death in a case which has been under the observation of a highly-skilled physician sometimes impossible, even for him, to determine, but certifying physicians may, from a variety of motives, make statements which are incomplete or misleading. Leaving out of account deliberate fraud—which we may safely assume to be a motive of negligibly small statistical importance—respect for the tradition of professional confidence, unwillingness to wound the feelings of a survivor, the influence of some fashionable but erroneous medical doctrine, all contribute to falsify the returns. Farr's simple good sense led him not to deny these probabilities but to act on the assumption that, in a large proportion of the total deaths, what is stated on the death certificate *is* a rough approximation to the truth.

He did not incite his official superior to dragoon the medical certifiers into adopting some really "scientific" nomenclature of causes of death, and he was largely content with merely topographical diagnoses. "Mr. A," said the bored judge to a prolix barrister, "I wonder whether you could arrange your observations in some order; any order you please, say, alphabetical." Alphabetical order is better than none. During Farr's life and since his time, both nomenclature and classification have been improved, but in England we have never departed from the principle that it is not the business of a statistician sitting in an office to try to know better than the certifying practitioners why people died. Farr did not, we do not now, classify causes of death, we classify what practitioners say are causes of death. But, however anxious one may be not to sophisticate the data, there is often the difficulty that a certifying practitioner is unable or unwilling to choose between alternatives. Suppose, for example, a person is suffering from a chronic disease, let us say consumption, and that partaking of some infected food he develops typhoid fever. He dies and the doctor puts on the certificate: "Pulmonary Tuberculosis—Typhoid Fever." What is the cause of death? Are we to tabulate to tuberculosis or to typhoid fever? Perhaps you will say to both, and this is, to some extent, done. But even single tabulation leads to bulk, and were double tabulation carried out completely our statistical reports would be impracticably bulky. Therefore, a statistical office must have some rules of preference and in the history of one country these rules may be changed while two countries may adopt different rules. If, for example—to take a more probable combination—a death certificate recording "Influenza—Pneumonia," is assigned to influenza in one country and to pneumonia in another, comparison of the two reports may lead to erroneous conclusions. I mention this rather technical point because, if a librarian is asked to supply information as to rates of mortality from some particular disease in different countries or in

the same country at different times, and notes very striking differences, he should ask himself whether the explanation may not be a purely technical one.

I have said enough to give you an idea of the difficulties Farr had to surmount, and it is not surprising that in the early reports the analysis of causes of death is not carried into minutiae. He, undoubtedly, did succeed in giving an adequate account of the distribution in space and life-time of the principal causes of mortality. One of his most important achievements was to relate mortality and its causes not only to sex, age, and place of residence, but also to occupation. It occurred to him that in males, since the deceased's occupation is recorded on the death certificate, while in the census year the occupations of all males are recorded in the census schedules, if one classified the deaths in the census year (or, as in later practice, in the three years, of which the census year is the middle) by occupations it would furnish an appropriate numerator to put over the enumerated living population as denominator. The data of 1851 were first used in this way for the study of the effects of occupation upon mortality and the series of decennial analyses of which that of 1921 is the latest are the most valuable data for the study of this important question which we have. No other nation has improved on Farr's system in principle. Time does not allow me even to mention other examples of Farr's work. When he retired he left a vital-statistical system which was acknowledged to be the finest in the world. Since then other nations have profited from Farr's labours, and in certain particulars some countries (for instance, Switzerland, with her system of strictly confidential notification of causes of death) have improved upon the English methods, but it is not being unduly insular to say that, still closely following the path made by Farr, we still lead the world in the matter of national vital statistics.

I pass to a practically important question. How far have changes in Farr's lifetime and since his death disturbed comparability? A librarian is asked, let us suppose, to advise a young student who is anxious to make a general comparison of the vital statistics of England and Wales, in 1840, with those of England and Wales, in 1930. The student, having been born, let us suppose, in Liverpool, wishes to make a special study of the changes in his native place. The librarian will naturally recommend a perusal of the Reports of the Registrar-General, what cautions, if any, ought to accompany that recommendation?

For the case of England and Wales as a whole, he will in the first place point out that both the age, constitution and the occupations of the people have changed greatly in the last ninety years, that the England of our great-grandparents was not, indeed, any longer an agricultural population, but did contain a very much larger proportion of small farmers and peasants than now, and that it was a younger population. He will also point out that, partly owing to a change of nomenclature but still more owing to increasing medical knowledge, some rates of mortality have seemed to increase more than they have really increased. The typical case is that of cancer. There is a difference of opinion between competent judges as to whether in any true biological sense, mortality from cancer has increased at all; there is unanimity amongst them that the recorded increase is largely

a matter of more accurate book-keeping, that thousands of deaths which ninety years ago would have been assigned to vague or merely topographical causes, are now properly certified to be due to malignant disease. These cautions I need, perhaps, hardly stress, any sensible person would think of them. But it may not, perhaps, occur to anybody who has not given special attention to the matter, that the aspirant to knowledge of the changes in his native city of Liverpool must be told that he cannot, by means of the Registrar-General's reports make *any* comparison between the vital statistics of Liverpool in 1840 and 1930, that in order to do so he would need specially extracted data which, indeed, it might be difficult or impossible for the officials in Somerset House to provide. Since 1911 the statistical unit of our national statistics has been changed from that of Farr's time. When the first registration act was passed local government as we know it was in its infancy and the Registrar-General naturally took as his statistical units geographical units which were to hand—*viz.*, the new poor law unions, these were taken as registration districts and aggregated into registration counties which counties with, I think, only one exception, did not correspond to any ancient geographical county. With the growth of local government and urban population, registration districts bearing such names as Liverpool and Manchester, became less and less equivalent to the civic units known by the same names. The county borough of Liverpool, which is what anybody living now understands by Liverpool, is geographically and economically different from the old registration district of Liverpool, which is the Liverpool against which old Farr aimed his statistical arrows often enough. In 1911 (the last census year for which particulars are available) the population of the Registration District of Liverpool was 128,673, of the County Borough 746,421. It is true that the greater includes the less, that the county borough includes the old registration district, but the change in constitution is so great that any direct comparison of the death rates of "Liverpool" in 1840 with those of "Liverpool" in 1930 is impossible. Anybody who, with an exact knowledge of the area of the present county borough, tried to work backwards would find, in all probability, that it includes not only other registration districts but, perhaps, parts of registration districts, the data of which could not be isolated.

To ascertain whether this were so, reference should be made to the Census Report of 1901, because that report not only gives a map of the registration districts in each county, but sets out the constitution of each administrative unit. On p. 29 of the volume dealing with the County of Lancaster, we find that the county borough of Liverpool includes the registration district of Liverpool and the registration district of Toxteth Park, but only seven of the eleven sub-districts of West Derby. Between 1901 and 1911 another sub-district (Fazakerley) of West Derby was included in the county borough. Down to 1911 the populations of sub-districts are recorded in the annual reports of the Registrar-General, so that it is possible to explain to the student, how far by adding to the old registration district of Liverpool, other registration districts and sub-districts recorded in the series of reports prior to the new system, he can make a valid comparison. Since *causes* of death were not tabulated for a smaller

unit than the registration district, in the published reports, it will be seen that a comparison of these through the ninety years would not be possible.

I have discussed this example at tedious length because it is in such a matter that a technical librarian can be particularly helpful. Naturally, if he has to help a foreign student, for instance, an American post-graduate, he will need to explain our very perplexing habit of using the same word, such as county, in three different senses. He should advise the student to read carefully No. 3 of the Statistical Handbooks Series of the League of Nations (Health Organisation), published in 1925, and the introductions to the county volumes and general report on the census of 1901.

One further difficulty of secular comparison of English vital statistics is due to the fact that now deaths are allocated to the *de jure* population to which they belong, and in earlier years this was not done. For instance, I happen to have on the table the Registrar-General's Annual Report for 1901. I turn to registration district No. 14, London City, which consists of three registration sub-districts, St. Botolph, St. Sepulchre, and All Hallows, Barking. The populations of these sub-districts were 11,040, 7,900, and 8,724, the registered deaths were 128,745 and 94. This does not, however, mean that in 1901 the registration sub-district of St. Sepulchre was devastated by a strictly localised epidemic. Within the boundaries of this sub-district is St. Bartholomew's Hospital, and the deaths of patients in a great hospital attracting sick persons from all over the country are plainly not chargeable against the resident population. In modern practice these deaths are allocated to the area of ordinary residence of the patient.

I hope that these hints will enable a librarian to warn an inquirer of the grosser pitfalls; study of the works I have mentioned will put him on his guard against many lesser dangers.

It remains to say a word on international comparisons. The handbooks of the League of Nations series will, so far as they have gone (many important countries have not been included), give the librarian all the information he needs and the publications of the International Statistical Institute (8) are invaluable sources of information for recent years. For earlier years the international tables printed in the annual reports of the Registrar-General are available. In a general way, it may safely be said that the death rates from all causes issued at any rate, by most European countries—and, of course, the United States Registration Area—are quite trustworthy. When, however, rates of mortality from particular, named, causes of death are in question, all the difficulties I have pointed out in our national statistics, above all the variations in the practice of tabulation, have to be faced. I think that a librarian asked to help a student who wished to make an international comparison of rates of maternal mortality, cancer, or even tuberculosis, should advise the student to make himself acquainted with (*a*) the system of certification of deaths, (*b*) the practice of tabulating joint causes of death in each of the countries he proposed to include in his study. Mere copying of columns of figures or rates of mortality from official documents cannot lead to satisfactory results. It may sound cynical, but it is a good working rule to suspect that when either, in the secular series of one country

or in a contemporaneous comparison of the data of several countries, rates of mortality from a named cause contrast greatly, the explanation is a difference in the method of book-keeping, not in the deadliness of the disease.

I have, I fear, exceeded a reasonable limit of space and have remained struggling in a desert of technicalities. Certainly, I have given no hint of the romantic interest of vital statistics, of the fascinating problems they suggest. But, after all, your primary object is to help others, and difficulties usually are rather dull.

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6. Farr, William. *Vital Statistics: A Memorial volume . . .*, edited by N. A. Humphreys, London, 1885.
7. League of Nations (Health Organisation). Statistical Handbooks Series. The countries the medico-statistical systems of which have been described in this series are: Holland, Belgium, England and Wales, Spain, Austria, Scandinavian countries, Portugal, Czechoslovakia, France, Hungary, Switzerland, Ireland, Scotland, Canada. These pamphlets are complete guides to the respective systems.
8. The *Aperçu de la Démographie des divers pays du monde*, published by the Office Permanent de l'Institut International de Statistique, in 1932, is an extremely valuable summary of data, but by no means the only publication of the Institute which should be in every library. The office of the Institute is at The Hague.

DISCUSSION.

There was no discussion but Professor Greenwood, after presenting his paper answered questions put by many delegates.

The Public Library as an Aid to Industry and Research.

By J. P. LAMB, *Chief Librarian, Sheffield.*

The specialised departments of Public Libraries in commerce, science, and technology have now been established in the larger cities for a sufficient length of time to enable us to assess their value to the community, and more especially to that important and sorely pressed section concerned with the production of goods and services and the intense experimentation and research which modern conditions impose on that work.

There is a tendency on the part of librarians to complacency; and on the part of industry to superiority. In no branch of knowledge or activity are books so vital as to industry; and the librarian on his part sometimes fails to realise that his job does not stop at the provision of printed matter, but extends to the much more difficult problem of making it productive.

I do not propose, in this short paper, to discuss the general organisation of such libraries, but to suggest some ways of strengthening the connection between them and the special public they attempt to serve.

It has always seemed to me that a library really only deserves the name if it establishes an active contact with its readers. Without that it is in the position of a manufacturer who produces goods but neglects to secure a market for them. Though books—and by this inclusive term I mean, of course, periodicals and printed matter of all kinds—form the actual basis of its work, those books are valueless if the library fails to build up an organisation which will enable it to obtain the maximum utility from them.

This clearly implies intelligent selection of book stock, efficient internal organisation, and the creation of means to bring to those books the right users.

I am by no means convinced that public librarians are sufficiently expert in book provision for this type of library. We public librarians are creatures of tradition, and we find the break from the old literary conception of a library a painful and drastic operation. Many of us, indeed, still think of libraries in terms of “pure literature.” We are apt to bring to our task of keeping up to date a modern scientific library the outlook of the cloister; and to shrink from the ruthless modernity of weeding. The staggering pace of research, the extraordinary development of the application of chemical processes to industry, leave us just a little bewildered, and I am frank enough to admit that this state of mind, aided not a little by the fact that the book funds of most public libraries are quite inadequate to meet their normal requirements, does not allow us to make as efficient a book provision as is really necessary in these highly specialised libraries.

At the same time, the paucity of our book funds should force us to make every effort to eliminate waste. Most large cities have, in

addition to the University Library—which usually carries a wide range of scientific literature—many specialised libraries of a scientific nature. Clearly there is room for close co-operation among these libraries to prevent unnecessary overlapping in book provision.

Before touching on the means to be employed by the public library to make its records service more useful to industry, it may be permissible to consider the attitude of those concerned in industry to the library. It is, of course, a truism that the ordinary man completely fails to grasp the simple and essential fact that in these days, when national economic survival is largely a question of applied and organised intelligence, the book has become the most important tool of industry. But it is truly astonishing that this point of view should be shared by many responsible for directing the actual machinery of our economic life. Yet the facts are scarcely in dispute. The industrialist who uses a scientific library is a comparatively rare being; the fact that a commercial library provides such elementary aids as codes and directories often escapes the notice of merchants big and little; and in the year 1932 a great firm in my city was not aware that British patents specifications were stocked at the library, though they have been there for fifty years.

It is obvious that much publicity is needed to convince many people engaged in industry in the first place that books are tools; secondly, that a library really contains books; and thirdly, that an organised, specialised information service is a natural activity of such a library.

But before proceeding further in this pleasant pastime of throwing stones at the other fellow, it is, perhaps, advisable to examine our own organisation to see whether developments are possible; and also to explore possibilities of co-operative work with the very fine special libraries of research maintained by many firms of enterprise and vision.

I have already referred to the need for co-operation between special libraries in an area to avoid overlapping in book provision. Recent developments have convinced us all of the advantages of book pooling and interchange among grouped libraries, but there are added advantages to be gained by using this machinery before buying books as well as after.

I have always felt that the regional library systems, organised at great expense of money and energy, are putting the cart before the horse in arranging for the interchange of books without giving any consideration to the more important task of preventing overlapping in book provision.

There is much duplication of expensive and specialised books in public, university, and special libraries in areas where easy and rapid book interchange is quite possible; and I feel that some of this could be avoided by co-ordinating the book purchases of these libraries. Many books must obviously be stocked in every library; but if free interchange of books and readers can be arranged, there is no reason why several copies of certain books should be purchased by the various libraries in the larger cities. It might be possible, given this interchange, for each library to specialise on certain subjects, the other libraries in the group avoiding all but the standard stock on those subjects. To some extent the public library practises the principle of exclusion—for example, in medicine and law—and if

in a city or area there is a specialised library which is willing either to loan books to the library or admit students recommended by the public library, there is surely no reason at all why the public library should waste its book fund by attempting to duplicate the stock of such a specialised library. There are, of course, definite limits to this idea of co-operative book provision. The special libraries, which are usually private libraries, have little to gain, and much to lose, by such an arrangement; and only a lively sense of duty to the community, and the knowledge that they are contributing to a wider bibliographical provision for their area, may make them willing to join such a movement.

There is a very strong case for definite collaboration in book purchase between the public library and the University Library; and in particular, in the acceptance at the University Library of recommended readers from the Public Library. Such an arrangement has been in operation between the University Library and the Sheffield Public Libraries for some time. The magnificent range of scientific periodical files of the University Library is now available to my general students; and consultation in the case of expensive and specialist books is helping both libraries to offer a wider range to their readers.

Most technical departments of public libraries make current card indexes of periodicals to supplement the Industrial Arts Index and Engineering Index, and my own experience leads me to believe that this indexing is one of the most important functions of the Technical Library. In Sheffield, where many firms have large and expert research staffs, there are frequent requests for periodical articles on technical subjects. Although a wide range of technical journals is stocked in our Commercial and Technical Department, it is astonishing how many of these requests have to be met by loan through the National Central Library. This leads to an interesting suggestion. Most works' libraries carry a fairly extensive selection of technical journals dealing with their products and methods, many of them of a very specialised type. There would be obvious advantages in a pooling of these periodicals with the public library as a medium of exchange. The machinery required for such a pooling need only be a simple card index at the Public Library of the files of all scientific and technical periodicals in the area, whether at special libraries or works' libraries—a local miniature of the extremely valuable World List, which we all find an indispensable tool.

Given willing co-operation between the libraries concerned, this pooling might be extended. An index of articles of particular value to the industries of the district might well be made by the library staff. The ideal scheme would be the presentation to the public library of back numbers of these periodicals, on receipt of a new issue, for indexing and permanent preservation; but there are practical difficulties. Many firms circulate these periodicals among their staffs, and prefer to retain them for file afterwards. The public library, on the other hand, would be faced with the problem of shelving and binding wide ranges of periodicals, and few of us could undertake these charges to the full extent. I feel, however, that a step forward would be made if all technical periodicals could be pooled for inter-loan, and if the public library could maintain an index of

their contents. I do not know if this work is already done in works' libraries ; certainly it is not done in the great majority which only provide the nucleus of a library ; and an arrangement whereby one central organisation undertook this work would not only simplify the means of obtaining important information, but would avoid duplication of work by many similar organisations.

In attempting to make the Commercial and Technology divisions of public libraries of real service to industry, the public librarian must not lose sight of the fact that although the technician as a rule is competent to use books efficiently, many small firms which use the library are unable to employ research staffs, and, therefore, are not well informed on the literature of their subjects. The ordinary library catalogue merely provides a list of the library's contents ; the marvellously intricate systems of classification that the fertile minds of librarians have produced usually succeed in hiding books under group headings which only faintly reflect their real subject matter. The sensible librarian recognises that for readers who are not familiar with their literature, the librarian is the best and, indeed, the only catalogue. But even librarians are fallible ; occasionally they die ; and the accumulated book knowledge of many years is lost. To overcome these difficulties, the special departments of the Sheffield Public Libraries have been engaged for some years on the compilation of indexes of information. These are extensive supplements to the usual classified catalogue, containing in dictionary form, analytical entries of the most important matters dealt with in text books which obviously cannot be shown in the catalogue proper without making it too large and involved to perform its primary purpose as an index to the books in the library.

These then, are some suggested methods of making a more active contact between the public library and industry—or rather with the technicians and the research departments. But the library has a wider service to offer industry, and though it scarcely comes within the scope of this Conference of special libraries, I hope I may be allowed to refer to it very briefly.

An active library system should carry large stocks of modern technical books in its lending libraries for the artizan ; it can do great service to technical education by this means. It should, therefore, try to make contact with any activity whose aim is to develop the use of technical books among industrial workers. And one field of co-operation between the Sheffield Public Libraries and the University has been very fruitful of results.

The Department of Applied Science at Sheffield University has for many years organised groups of workers of all grades for study of their particular trades. These groups are known as the Trades Technical Societies, and have over one thousand members. The Public Libraries have supplied books to these classes for several years. But many of the special processes of steel production in Sheffield are not dealt with in books. Recognising this, the libraries prepare each year extensive bibliographies of periodical literature references and distribute these to members of the classes. The result of all this work is a growing interest in research, and an appreciation of the complexity of modern production by many workers who might otherwise be sceptical about the importance of scientific methods.

We may then, agree that the public library can, and in some cases does, provide material and an organisation which will help industry in its unceasing fight to maintain its position ; and that further developments are possible. We are, however, faced with the problem of convincing commerce and industry of the library's ability to do these things. How can this be done ? Circular letters, bulletins, and other printed and stencilled matter find a quick and unhonoured place in the waste-paper basket. On the rare occasions on which these are read, it is not unusual for an indignant ratepayer to accuse us of wasting money by sending them. There is much prejudice to be removed ; much educational work to be done. Though an occasional postal appeal may slip through the barrage which industrialists erect around themselves as a protection against the blandishments of their fellows, I am convinced that the only lasting and effective contact is that provided by efficient service.

DISCUSSION.

Mr. Lamb's paper and the following paper by Mr. Headicar were discussed together.

MR. E. N. SIMONS referred to the usefulness of the Sheffield Public Library. He asked whether a system could be organised whereby borrowers at a distance could telephone and order books to be sent. He remarked that books often became obsolete quickly and asked how quickly public libraries acquired the books which were of importance to those engaged in industry.

MR. S. K. JONES mentioned that weeding out of books should not be done too ruthlessly. Books no longer wanted locally might be valuable to the National Central Library.

COLONEL L. NEWCOMBE said that whilst, in the past, the National Central Library had been limited in its ability to act as a store the new premises would give accommodation for a million books.

MR. R. BRIGHTMAN said that there was no doubt that industry had largely neglected the facilities offered by the municipal libraries, and Mr. Lamb and Mr. Headicar had indicated possibilities of co-operation which should be fully explored. Both the special librarian in industry and the public librarian could assist each other in the selection of books and co-operation in the disposal of journals might be found to provide a solution to a vexed problem. Probably as a result of local effort in these fields ASLIB might be able to recommend some lines of policy for general adoption. He suggested that it might be worth examining, in one or two industrial centres, the probable cost of a technical central library with the idea of a combined effort between local industry and municipal authorities in stocking it.

Research : Where the Library and the Librarian come in.

By B. M. HEADICAR.

Research—in its widest meaning—must depend largely for results upon written records, and the value of the librarian is at its greatest in tracing existing material on similar topics because of his knowledge of existing indexes and other catalogues of published material.

Sir J. J. Thompson, at one of ASLIB's conferences, argued that he believed it was far better for research workers to try and solve problems before reading up what other people may have written on a particular topic. This may be matter for contention, but, at any rate, the other contributors have to be looked up sooner or later, and it is to the library and the librarian that the reader must turn for help. If for no other reasons, the earlier literature of a subject must be examined for suggestions as to method. The librarian knows where to hunt for information, and his library becomes the storehouse of such information when found. A great hardship is occasioned frequently for all parties when the enquirer is afraid to divulge his needs in full, sometimes because he does not want to appear ignorant of a subject which he is assumed to know thoroughly, but more often because he fears he may be giving away secrets which the librarian may possibly sell to some other researcher in the same problem. No true librarian is capable of doing anything of the kind. He is out to serve any enquirer to the best of his ability, knowing that the greater the service he and his library can render, the more assured becomes the future of both. Many a librarian has had hard things said of him and his library because they have failed at a critical moment because a seeker after information had told only the least important of his wants and then had expected the librarian by some process of telepathy to discover exactly all that was needed. I once had a reader who spent about half an hour looking over the open shelves, apparently without result. I approached him and asked him what he wanted to find, as I might be able to save his time. He replied, "You mind your own business." I left him, but shortly afterwards he came to me and said, "Perhaps you can help me. I want to find out what is the difference between 'a Kentish man' and 'a man of Kent'." I went without a word to Brewer's "Dictionary of Phrase and Fable" and found the desired information immediately. I handed the volume, opened at the right page, to the reader, who copied out what he wanted, left the volume on the ledge, and went away without saying another word.

A man may know his subject thoroughly, and yet be incapable of presenting accurately his own findings or of comparing them correctly with the results of other people's work. The librarian can, where necessary, teach the fundamental methods of procedure, to the effect that his client must differentiate clearly between fact and opinion. There is a remarkable difference in the mind of the average

reader between personal knowledge and mere report, and every writer should be prepared to indicate such points clearly.

The librarian will emphasise the fact that comparisons of data must be based upon data that are strictly capable of comparison, that quotations from other works should be absolutely correct, and that the specific editions of works from which quotations are made must be clearly set out, so that verification is easy. A writer should never be satisfied with an argument based on a quotation copied from a secondary source. If he cannot see the original he should be most careful as to the weight he gives to evidence of such a nature.

The sources used should be carefully listed and a copy of the complete list be handed to the librarian for filing in the library and for keeping the list up to date possibly, especially if the subject is specially appropriate to the library.

The librarian is able and willing to instruct the reader as to the best methods of compiling the bibliography of a subject, the rules to be followed, and the information which is essential in it. He will gladly check titles of periodicals and other publications and save users of the bibliography much time in their researches in another library. How often one comes across such references as the "Colwyn Report," the "Macmillan Report," the "May Report," etc., whereas in no case does the proper name quoted appear in the title page of the particular publication. Frequently one is referred to the "Statistical Journal" instead of the "Journal of the Royal Statistical Society." It should be remembered that these lists are likely to be used by people with no particular knowledge of English publications, and it is the ignoramus who should always be in mind when compiling these bibliographies, and not the expert only. Author, title, pages, date, and place of publication represent the minimum of information that should be given in the case of a book, and the particular issue as well as volume in the case of a reference to a periodical. The author may seem quite a simple thing to put down, but when one remembers the hopeless variations in the treatment of compound names, official publications, etc., one realises again the value of the librarian in pointing out the standardised rules for dealing with these problems. Quite recently someone wrote to the papers expressing his disgust at not finding three works in the British Museum Catalogue. The B.M. replied to the effect that the works *were* in the catalogue, and a simple question to any librarian would have saved much time and correspondence. What is more annoying to find is that in your list you have Baring-Gould under G, while the library catalogues have it under B. The librarian does not profess to know your subject, but he does understand the technicalities of librarianship.

The wise librarian will advise his client that in his research he should discover or compile his list of references first, then make a casual survey of the literature available, noting those works which will require detailed consultation and those which are less important. No greater mistake can be made by a reader than to settle down to long and careful study of the first book which he handles, only to find later on that the gist of it had been extracted by a later writer.

In all these matters there should be the greatest confidence and co-operation between librarian and reader. The former can save the latter much valuable time by explaining the special qualities of ency-

clopædic works, the special functions of dictionaries, etc., and the best methods of using them, and the particular purposes served by various atlases, the meanings of lines and colourings in them, all extremely important and so frequently misunderstood and misinterpreted accordingly. Mr. Fuller's paper at this conference should go a long way to help readers in this particular problem.

It is the librarian who knows best where and how to get most of the works you require which are not in his own library, for he will be in close touch with the National Central Library, the Science Library, or the Joint Committee on Library Co-operation, and many similar bodies, one of which is almost certain to produce even the most obscure work.

In the special library in particular the librarian is the one person who can determine adequately how long a document is of service. The contents of the special library are not collected for the mere sake of possession. Knowledge of what and when to discard is one of the principal assets of the trained librarian, who realises that his material is required only just as long as it will render service. In any library the provision of mechanical aids up to a point is desirable, and it is the duty of any library to see that such are available as far as it is humanly possible, but the explanation of the use of these is the librarian's job. Nothing mechanical can take the place of the human element in the staff of the library and the personal contact with the librarian.

For the best results the absolute confidence of the reader is essential. Just as a doctor will expect a patient to explain fully and accurately his symptoms before writing his prescription, so the librarian must have a full story of *his* patient's symptoms before he can fully and accurately prescribe his remedy.

A librarian has been defined as "one who earns his living by attending to the wants of those for whose use the library exists; his primary duty being, in the widest sense of the phrase, to save the time of those who seek his services." If every reader would realise the truth of this definition and direct his operations in the library accordingly, he would be forced to acknowledge that he found the librarian "an ever-present help in time of trouble."

Specialist Dictionaries : criticism and suggestions.

By CLIFFORD FULLER, B.A.

Assistant Librarian London School of Economics and Political Science.

There are certainly a number of good specialist dictionaries on the market, but there are, undoubtedly, many which do not deserve that name, and it is advisable that demand for such dictionaries should be so educated and directed that encouragement be accorded only to those of superior quality. I have chosen the adjective "specialist" deliberately, because technical and technological are both much abused terms in this connection, and moreover, I wish my short paper to embrace more types of dictionary than the common use of either technical or technological would suggest.

The specialist dictionary maker is faced with a number of stern problems, and the success of his production is dependent upon his solution of these problems in the early stages of his work. The many comparative failures on the market (I am judging, advisedly, on a high standard) are due to the ill-success with which the editors in question have attacked these problems.

In the first place, the scope of the dictionary must be rigidly defined. Better a narrow field thoroughly ploughed than a wide domain worked at random. Granted, a dictionary of limited scope caters for a relatively limited market but, on the other hand, the expense of production is less and the percentage of error and omission largely reduced. Who would not prefer half a dozen specialist dictionaries of rigidly defined scope to one or two massive compilations with twenty-lined title pages vaunting their claims as keys to terminology in a number of by no means closely allied topics? As an example, I would quote Kettridge's two-volume French-English and English-French :

"Dictionary of technical terms and phrases used in civil, mechanical, electrical, and mining engineering, and allied sciences and industries, including geology, physical geography, petrology, mineralogy, crystallography, metallurgy, chemistry, physics, geometry, abbreviations, and symbols, weights and measures, compound conversion factors, etc., and a method of telegraphic coding by which any entry in the dictionary can be expressed by a ten-letter cipher word, with indicator and check. The civil engineering terms comprise those used in the surveying and construction of railways, waterways, roads, bridges, etc. The mining terms comprise those used in getting metals, coal, oil, and other minerals, and quarrying, exploration, surveying, boring, excavation, sinking, drilling, ventilation, lighting, haulage, hoisting, assaying, ore-dressing, management, etc. The mechanical terms comprise those used in mechanical science, mechanisms, specifications of machinery, plant and tools, strength of materials, smelting, refining, founding and working of metals, building, carpentry and joinery, lighting and heating, steam, hydraulic, oil and gas engineering, rail-locomotion, machine-tool work, scientific research, etc.—containing the translations of one hundred thousand words, terms, and phrases—illustrated by numerous instructive examples and explanations. The whole arranged on original plans in progressive alphabetical order in the readiest form for rapid reference."

I would not criticise the workmanship of this dictionary except from the particular viewpoint of the catholicity of its scope. On all other counts it is a satisfactory production.

Having rigidly defined the field of his dictionary the compiler must decide as to its form and must set his face unreservedly against any desire to usurp the functions of an ordinary general dictionary and grammar combined. Here I would draw attention to Webel's recently-published German-English technical and scientific dictionary, which covers chemistry, physics, medicine, botany, mineralogy, petrology, agriculture, engineering, and a multitude of other branches of science. The scope is again too wide but in contrast to the above-mentioned Kettridge, Webel is limited to *words* and does not crowd his pages with "numerous instructive examples, explanations, and commentaries."

At this point I cannot do better than quote from the introduction to Pfohl's *Dictionnaire des matières et produits industriels pour toutes les branches de l'industrie et du commerce* :

"The gap between general and technical dictionaries of different branches and various size will, perhaps, never be filled up entirely, for a dictionary which would meet all desires and comprise all branches would be certain to share the fate of similar large undertakings ; it would never get completed and its first part would have become antiquated before the last volume had appeared, which would be even more keenly felt in technical matters.

It appears, therefore, to be indispensable to restrict the dictionary, either to one or the other branch or to a limited circle of readers. The present dictionary endeavours to supply those engaged in commerce and industry with those terms for commercial articles which they need in their daily correspondence and which they mostly fail to find in the general dictionaries. The selection of the terms was made from several points of view which cannot be explained in full. It may suffice to say that, above all, practical considerations prevailed, that a certain knowledge of the foreign languages had to be taken for granted, as well as the faculty of forming similar expressions with the aid of given terms."

I would emphasise, above all, this "certain knowledge of the foreign languages, taken for granted, as well as the faculty of forming similar expressions with the aid of given terms." This, in my opinion, should be the cardinal rule of specialist dictionary compilation. Its strict application would guarantee the construction of better and smaller dictionaries.

My next example complies with my first suggestion—the rigid definition of the dictionary's scope—but offends, violently, the aim of my second point, namely, to refrain from competition with a general purpose dictionary. I have in mind the "Pentax" Banking Encyclopædia (terminology and phraseology), in English, French, Italian, Spanish, and German, by De Kaminski, and published in 1928. It gives technical terms in the daily routine of banking and claims further, to give "sentences explaining the use of these expressions, *rendering the immediate use of these terms possible*." This appears to me as catering for very lame dogs, and the general result is that the dictionary is heavily padded and far bigger than is necessary considering its clearly-defined scope. In many cases lengthy sentences are used to illustrate the use of simple terms and these sentences, by their very nature, introduce more difficult expressions than those they aim to explain. For example: "To save"—"In order to save telegraphic expenses it will be quite sufficient to wire us the word 'allright,' accompanied by your signature." Not a very brilliant example to illustrate the very ordinary verb "to save." The lay-out of this dictionary is so planned as to show the examples in the five

chosen languages on adjacent pages, but frequent typographical errors mar many pages, and we are thus brought to the third point to be considered by the dictionary maker. A first-rate printer is an essential, and where several languages are concerned the proof-correcting must be beyond reproach. Although one compiler may possess an adequate knowledge of several languages to compass the actual compilation, the proofs of each individual language should be submitted to a native expert, or many errors will pass, and thus help to condemn the work proportionately in the eyes of its users.

I will return to Pfohl to give you an efficient example of the manner in which the various problems of the specialist dictionary-maker can be solved, both economically and rationally. The following extract is the first page of the French section, and will be sufficient to render the scheme clear to those who are unacquainted with this very handy tool :

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| <p>1 abât-chauvée, laine de rebut, <i>δ</i> 577, <i>e</i> 8944, <i>r</i> 819.</p> <p>2 -jour émaillé, <i>δ</i> 8463, <i>e</i> 3555, <i>r</i> 11339.</p> <p>3 -jours, <i>δ</i> 5679, <i>e</i> 5620, <i>r</i> 101.</p> <p>4 ablette, <i>δ</i> 1141, <i>e</i> 1076, <i>r</i> 9962.</p> <p>5 abreuvoirs automatiques pour écuries, <i>δ</i> 10112, <i>e</i> 683, <i>r</i> 1317.</p> <p>6 abri, auvent, <i>δ</i> 8831, <i>e</i> 7817, <i>r</i> 5560.</p> <p>7 absinthe I, <i>δ</i> 140, <i>e</i> 103, <i>r</i> 7016.</p> <p>8 -II, <i>δ</i> 10943, <i>e</i> 11347, <i>r</i> 103.</p> <p>9 accessoires à tisseranderie, <i>δ</i> 10845, <i>e</i> 10731, <i>r</i> 5873.</p> <p>10 -d'ambulances, <i>δ</i> 8227, <i>e</i> 356, <i>r</i> 8289.</p> <p>11 -de billard, <i>δ</i> 984, <i>e</i> 1021, <i>r</i> 718.</p> <p>12 -de chaussures, <i>δ</i> 8798, <i>e</i> 1182, <i>r</i> 8302.</p> <p>13 -de composition d'imprimerie et d'impression, <i>δ</i> 1399, <i>e</i> 7790, <i>r</i> 7406.</p> <p>14 -de parfumeurs, <i>δ</i> 7086, <i>e</i> 7212, <i>r</i> 6358.</p> <p>15 -de pianos, <i>δ</i> 7291, <i>e</i> 7313, <i>r</i> 8109.</p> <p>16 -de pile ou d'élément, <i>δ</i> 2397, <i>e</i> 7111, <i>r</i> 7403.</p> <p>17 -de vidange, <i>δ</i> 117, <i>e</i> 10385, <i>r</i> 519.</p> <p>18 -[articles] photographiques, <i>δ</i> 7273, <i>e</i> 7289, <i>r</i> 10346.</p> <p>19 accessoires pour automobiles, <i>δ</i> 632, <i>e</i> 688, <i>r</i> 143.</p> <p>20 bicyclettes, <i>δ</i> 2560, <i>e</i> 9945, <i>r</i> 1133.</p> <p>21 -chars d'enfant, <i>δ</i> 4923, <i>e</i> 7202, <i>r</i> 3709.</p> <p>22 -coiffeurs, <i>δ</i> 744, <i>e</i> 4174, <i>r</i> 6302.</p> <p>23 -couturiers, <i>δ</i> 1644, <i>e</i> 8160, <i>r</i> 7390.</p> <p>24 -étudiants, <i>δ</i> 9731, <i>e</i> 9842, <i>r</i> 9224.</p> <p>25 -fabriques de maroquinerie, <i>δ</i> 5794, <i>e</i> 5734, <i>r</i> 3585.</p> <p>26 -fer-blantiers, <i>δ</i> 5021, <i>e</i> 10335, <i>r</i> 7379.</p> <p>27 -fontainerie, <i>δ</i> 1380, <i>e</i> 11075, <i>r</i> 7380.</p> | <p>28 accessoires pour fumeurs, <i>δ</i> 7703, <i>e</i> 9197, <i>r</i> 4267.</p> <p>29 -hôtels et restaurants, <i>δ</i> 7843, <i>e</i> 5064, <i>r</i> 8028.</p> <p>30 -instituts d'optique, <i>δ</i> 6950, <i>e</i> 8161, <i>r</i> 8048.</p> <p>31 -instruments de musique, <i>δ</i> 6577, <i>e</i> 5183, <i>r</i> 8806.</p> <p>32 -la construction des machines, <i>δ</i> 6156, <i>e</i> 5980, <i>r</i> 4988.</p> <p>33 -laiteries, <i>δ</i> 6470, <i>e</i> 2904, <i>r</i> 7080.</p> <p>34 -le jeu de golf, <i>δ</i> 3610, <i>e</i> 4560, <i>r</i> 1818.</p> <p>35 -lithographies, <i>δ</i> 5896, <i>e</i> 5896, <i>r</i> 4510.</p> <p>36 -machines à coudre I, <i>δ</i> 6632, <i>e</i> 8782, <i>r</i> 7386.</p> <p>37 -machines à coudre II, <i>δ</i> 6633, <i>e</i> 8786, <i>r</i> 5088.</p> <p>38 -machines à écrire I, <i>δ</i> 8755, <i>e</i> 10676, <i>r</i> 7385.</p> <p>39 -machines à écrire II, <i>δ</i> 8753, <i>e</i> 9345, <i>r</i> 10749.</p> <p>40 -maisons de banque, <i>δ</i> 737, <i>e</i> 784, <i>r</i> 592*.</p> <p>41 -pâtisseries, <i>δ</i> 5224, <i>e</i> 2468, <i>r</i> 7341.</p> <p>42 -phonographes, <i>δ</i> 7248, <i>e</i> 7263, <i>r</i> 7397.</p> <p>43 -tapissiers, <i>δ</i> 9836, <i>e</i> 8162, <i>r</i> 5861.</p> <p>44 -véhicules motrices, <i>δ</i> 6526, <i>e</i> 110, <i>r</i> 153.</p> <p>45 accessoires techniques pour machines, <i>δ</i> 837, <i>e</i> 10137, <i>r</i> 7123.</p> <p>46 accessoires techniques pour fours de boulanger, <i>δ</i> 442, <i>e</i> 6949, <i>r</i> 499.</p> <p>47 accordeons I, <i>δ</i> 202, <i>e</i> 117, <i>r</i> 215.</p> <p>48 -II, <i>δ</i> 11250, <i>e</i> 118, <i>r</i> 1667.</p> <p>49 accouplement à articulation, <i>δ</i> 3292, <i>e</i> 5453, <i>r</i> 9309.</p> <p>50 -à broches, <i>δ</i> 6612, <i>e</i> 6672, <i>r</i> 9121.</p> <p>51 -à brosses, <i>δ</i> 1458, <i>e</i> 1383, <i>r</i> 11198.</p> <p>52 -à cliquet, <i>δ</i> 5027, <i>e</i> 7153, <i>r</i> 10539.</p> <p>53 -à cône de friction, <i>δ</i> 5275, <i>e</i> 2465, <i>r</i> 8750.</p> | <p>54 accordeons à coquilles, <i>δ</i> 8307, <i>e</i> 9442, <i>r</i> 10260.</p> <p>55 -à cuir, <i>δ</i> 5767, <i>e</i> 5720, <i>r</i> 3566.</p> <p>56 -à débrayage, <i>δ</i> 570, <i>e</i> 3572, <i>r</i> 7747.</p> <p>57 -à douille, <i>δ</i> 4311, <i>e</i> 9108, <i>r</i> 5495.</p> <p>58 -à feuilles ou lames d'acier, <i>δ</i> 9365, <i>e</i> 3972, <i>r</i> 5496.</p> <p>59 -à friction, <i>δ</i> 7782, <i>e</i> 4166, <i>r</i> 5497.</p> <p>60 -à griffes, <i>δ</i> 4971, <i>e</i> 2139, <i>r</i> 10992.</p> <p>61 -à lames, <i>δ</i> 9381, <i>e</i> 9669, <i>r</i> 8946.</p> <p>62 -à plateaux, <i>δ</i> 8359, <i>e</i> 3920, <i>r</i> 2255.</p> <p>63 -articulé joint universel, joint bardan, <i>δ</i> 5421, <i>e</i> 10715, <i>r</i> 10914.</p> <p>64 -à ruban, <i>δ</i> 726, <i>e</i> 778, <i>r</i> 4412.</p> <p>65 -à vis, <i>δ</i> 3382, <i>e</i> 8840, <i>r</i> 1255.</p> <p>66 -des arbres, <i>δ</i> 10912, <i>e</i> 8794, <i>r</i> 9345.</p> <p>67 -de tiges, <i>δ</i> 9418, <i>e</i> 8283, <i>r</i> 9122.</p> <p>68 -électromagnétique, <i>δ</i> 2381, <i>e</i> 3496, <i>r</i> 11310.</p> <p>69 -flexible à [anières de] cuir, <i>δ</i> 5768, <i>e</i> 5739, <i>r</i> 3567.</p> <p>70 -par manchon, <i>δ</i> 6546, <i>e</i> 6588, <i>r</i> 8741.</p> <p>71 -s, <i>δ</i> 5592, <i>e</i> 2725, <i>r</i> 8742.</p> <p>72 accumulateur, <i>δ</i> 8204, <i>e</i> 119, <i>r</i> 217.</p> <p>73 -au plomb, <i>δ</i> 1075, <i>e</i> 5650, <i>r</i> 219.</p> <p>74 d'allumage, <i>δ</i> 11373, <i>e</i> 5165, <i>r</i> 218.</p> <p>74* -double, <i>δ</i> 1851*, <i>e</i> 4121, <i>r</i> 2061*.</p> <p>75 -hydraulique, <i>δ</i> 7493, <i>e</i> 5098, <i>r</i> 1723.</p> <p>76 pneumatique ou à air comprimé, <i>δ</i> 5972, <i>e</i> 2420, <i>r</i> 8773.</p> <p>77 accumulateurs (électriques), <i>δ</i> 204, <i>e</i> 125, <i>r</i> 220.</p> <p>78 -hydrauliques, <i>δ</i> 205, <i>e</i> 126, <i>r</i> 221.</p> <p>79 acétate chromique (basique), <i>δ</i> 1552, <i>e</i> 2050, <i>r</i> 9937.</p> <p>80 -chromique (normal), <i>δ</i> 1553, <i>e</i> 2051, <i>r</i> 9936.</p> <p>81 -d'alumine, <i>δ</i> 10049, <i>e</i> 134, <i>r</i> 9979.</p> |
|---|--|--|

To gain space each word appears only once in the whole dictionary. the corresponding expressions in the three other languages are indicated by a letter and a number. Each letter of the alphabet is divided, for convenience, into a number of sub-divisions. For each language a different type has been used. The result is that Pfohl has produced an excellent and comprehensive dictionary of very moderate bulk and of commendable clarity. Its scope is clearly defined, no trespass has been committed on the field of a general purpose dictionary, and no attempt has been made to impart grammatical instruction to the users who are, presumably, possessed of that very requisite "certain knowledge of the foreign languages." The printing (Brockhaus, Leipzig) is also of the highest standard. On all counts this dictionary shows what can be accomplished when a clear plan has been drafted and adhered to, and when excellent typography and efficient composition and proof-correction are maintained throughout.

Mention must be made also of the comprehensive series of Schlomann-Oldenburg dictionaries, still in course of publication. A score of volumes have already been published and specialists are thereby provided with individual volumes on such subjects as electrical engineering (including telegraphy and telephony), spinning, railway machinery, and other similarly closely defined branches of technology. Each volume gives the terms in six languages (German, English, French, Russian, Italian, Spanish), all six at sight, with illustrations which, for such specialist works as these, are of inestimable value. The arrangement of the terms is in systematic order from the scientific point of view. I would not suggest any criticism of this series, my purpose being, in the main, to attack the deficiencies of less ambitious and, at the same time, more prolific works.

I would now direct your attention to a dictionary which is at present, alone in its field and in the making of which certain innovations have been introduced which are peculiarly appropriate in this particular case—Dr. Hereward Price's *Economic Dictionary* (English-German and German-English). Dr. Price quotes authorities for the use of many terms, and the two volumes of his dictionary are provided with indexes to the quotations made. This innovation could be usefully imitated in certain other subjects (political science, ethnology, hygiene, for example).

Finally, I would mention Fink's *Fremdwörterbuch*, to my knowledge the only specialist dictionary of its kind in any language (here I may stand corrected). This work collects foreign words and phrases in current use in German publications and provides both explanation and translation into ordinary German. Such a dictionary is particularly useful when one considers how frequently a foreign term is imported into another language but used with different emphasis and significance. The compiler of a dictionary of this kind should be, perforce, abnormally sure-footed because the ground is treacherous in the extreme.

The addition of polyglot glossaries to technical books and articles has been suggested and in this connection I would mention by way of example Pitman's *Business Man's Guide*. This is a comprehensive dictionary of commercial information in English, but "for the sake of convenience and as a help to those engaged in foreign correspondence, the French, German, Spanish, and Italian equivalents of

English commercial terms and phrases have been given in every case." The addition of a polyglot glossary to this dictionary would certainly add largely to its value and there is no doubt that the systematic addition of polyglot glossaries to technical books and articles (at any rate, in the case of all dubious or ambiguous terms) would contribute considerably to the more efficient circulation and comprehension of the scientific literature of all tongues and thereby assist still more the work of international intellectual co-operation. But, here again, I would insist on Pfohl's proviso, assuming that "certain knowledge of the foreign languages in question." That way lies progress; otherwise misapplied energy, ragged workmanship, and chaos.

DISCUSSION.

Mr. Fuller's paper and the paper by Dr. Wüster were discussed together.

Mr. FULLER in presenting his paper drew attention more particularly to polyglot specialist dictionaries and claimed that we suffer from a surfeit of inferior productions. Demand should be so educated that encouragement be accorded only to those of superior quality. The following three points were particularly stressed: (i) The scope of the dictionary must be rigidly defined. (ii) The compilers must religiously refrain from usurping in any way the functions of an ordinary general purpose dictionary. (iii) The importance of a first-rate printer and proof correction beyond reproach. A small committee of native experts is suggested as a Board of Control in the creation of the dictionary. The recent inspection of over a hundred special dictionaries confirms belief in the above points and initial steps must be taken along these lines in order that future measures of selective birth-control should be exercised in the production of specialist dictionaries rather than, as at present, we should be subjected to the frequently erratic and unreasonable preparation and issue of short-lived "Defectives."

Dr. R. S. HUTTON presented Dr. E. Wüster's paper and referred to the unsatisfactory nature of the over-supply of polyglot dictionaries and the marked advantages which would accrue from an up-to-date series of unilingual technological dictionaries on an international basis, which proposal was endorsed by the Chairman.

Mr. FREEMAN HORN spoke on the importance of encouraging particular industries to standardise technical terms on an international basis, and deprecated the current practice of overloading many technical dictionaries on specialist subjects with terms outside the immediate scope of the subject. He claimed that the specialist on the subject, not the linguist, should be primarily responsible for the compilation of technical dictionaries. Mr. THEODORE BESTERMAN and Mr. L. C. WHARTON also spoke.

Mr. FULLER, in replying to the discussion, agreed with the greater importance of Dr. Wüster's ideal uni-lingual dictionary as stressed by some of the speakers. There would, however, always be the definite need for translation dictionaries and it was suggested that specialist dictionary production might be divided into two classes. (i) High-grade uni-lingual and polyglot specialist dictionaries of great comprehensiveness and depth in the chosen rigidly defined field, and (ii) smaller translation dictionaries suitable for the needs of the more general reader and research worker who do not normally need (or cannot necessarily afford) the more massive works of the other category.

Technical Dictionaries.*

BY DR. ING. EUGEN WÜSTER.

1. THE PURPOSE OF DICTIONARIES.

FORMATION OF CONCEPTS.

We systematise the innumerable impressions which we constantly receive from the outside world, by resolving them into concepts which, by means of names, we can always recall to our own or other people's consciousness.

This systemisation is simplest for concrete objects. Actually only individuals exist—*e.g.*, a flower which we are in the act of plucking, or an engine which we are running. A number of such individuals which seem to resemble each other in some respect we group together in our minds as one thing—*i.e.*, as a concept (idea). Such a group would be, for instance, the concept "Animal." This group consists of several subsidiary groups, so-called subsidiary concepts—*i.e.*, of animal divisions such as invertebrates and vertebrates. These divisions are further subdivided into species and subspecies.

To each such group of individuals, arrived at by "abstraction," we give a name. In so far as these names are elementary—*i.e.*, not formed by combining existing names, the choice of their phonetic form is arbitrary.

The concepts themselves are in part founded on characteristics, of the nature of the individuals—*i.e.*, on the sum of the qualities of each individual. On the other hand, concepts are also arbitrary, for it is open to us to choose any of the qualities of the individuals as the basis of the group. The ancestors of modern Germans looked upon whales as fish, owing to their habitat (the water). The founders of the modern zoological system based their classification on anatomy not on habitat, and therefore included the whales among the mammals.

SYSTEMS OF CONCEPTS AND NETWORK OF MEANINGS.

The aggregation of concepts which reflects the outer world in any man's mind forms a coherent whole, a "system of concepts." Hence, the names which he attaches to these concepts indirectly form a system, too—*i.e.*, a "language."

The co-ordination of names with concepts is, as we have noted, perfectly arbitrary. But in order to communicate intelligibly, large numbers of men use the same language. In one and the same language, however, some concepts have several names (synonyms), while the same names (homonyms) sometimes designate different concepts. The German Locomotive Standardisation Committee has collected the German names for the different parts of a locomotive; it has

* The original paper is accompanied by fourteen illustrations which are mostly typical pages or examples of different kinds of dictionaries. These illustrations will be exhibited at the Conference and afterwards may be inspected at the Association's office.

ascertained, for instance, that there 151 names altogether for fourteen parts of a stuffing box, that is to say, an average of eleven synonymous names for one concept. (Illustration 1.) As an example of a homonym we may take the German word "Anker". It designates part of a ship's equipment, or a foundation bolt, or part of an electrical apparatus (armature). In each special case, that is in any given sentence, the word has only one of these meanings. All the same there is a faint echo of the other meanings belonging to the whole "network" of meanings (the sphere of association).

The formation of groups composed of individuals of the outer world is also half arbitrary. But as soon as groups have names assigned to them and are thereby included in a system of concepts, that is in a language, they become comparatively stable. Every concept gains support from its adjoining concepts. In order to gauge a concept it is necessary to seek the boundary between it and its neighbouring concepts.

Thus, every concept and its name is embedded in twofold fashion in the stock of concepts contained in all languages: by means of the system of concepts and the network of meanings.

DICTIONARIES IN ONE LANGUAGE.

The stock of humanity's concepts, and even that possessed by one common language, is infinitely great. The number of animals and plants alone, to which names have been given, is estimated at one million. Electrical engineering has given rise to about 30,000 concepts. However, the human brain cannot remember more than a small fraction of these numerous concepts; it requires assistance in a form which retains the co-ordination between the concepts and their names or, *vice versa*, between the names and their meanings. This assistance is supplied by dictionaries in one language.

THE MULTIPLICITY OF LANGUAGES.

Many synonyms in a single language are comprehensible only to a certain proportion of those whose native tongue it is; these are special synonyms*; in the same way there are special homonyms. If the number and kind of the special synonyms transcends certain limits then we are no longer dealing with one single language but with two different ones. In that case individuals who speak only one or the other language cannot understand one another.

In this way the arbitrary manner of forming groups (abstraction) can develop fully: two different languages are distinguished not only by mere "special synonyms"—their systems of concepts are more or less differently built up. Moreover, their networks of concepts are not quite identical. Philologists describe this state of affairs by saying that the "natural method of expression" differs.

The differences between national systems of concepts may be noted even in such systems of concepts as have been consciously built up in recent times. Illustrations 2 and 3 show how electric machines are divided into groups according to their covering, in Germany and England. In some groups it is easy to see a similarity—e.g.,

* "Spaltungssynonyme" and "Spaltungshomonyme" in the original German MSS.

“flame-proof” and “schlagwettergeschützt”; in others, however, the lines of demarcation between the concepts are differently drawn.

POLYGLOT DICTIONARIES.

Polyglot dictionaries (“translation dictionaries”) are designed to form a connecting link between two languages. Their aim is to state how an expression in some given language should be rendered in another. That is to say, they are supposed only to co-ordinate two different phonetic forms. From what has gone before it is clear that only in the rarest cases are two phonetic forms exactly equivalent in meaning. Hence, in translation dictionaries the co-ordination of phonetic forms with their meaning plays a most important part.

The two following sections will demonstrate the different ways in which attempts have been made in dictionaries to solve the problem of this co-ordination, and also the advantages and disadvantages of the individual methods.

2. KINDS OF UNILINGUAL DICTIONARIES.

There are various kinds of unilingual and polyglot dictionaries.* The unilingual dictionaries will be dealt with first. They have several of the same advantages and disadvantages as the polyglot dictionaries, but these occur under simpler conditions and are consequently more clearly recognisable.

ALPHABETICAL DICTIONARIES OF EXPLANATION.

Example: Glossary of the U.S.A. National Advisory Committee for Aeronautics. (Illustration 7.) Alphabetic arrangement separates cognate concepts. But the best definition is the delimitation of concepts, as was shown in Section 1. Satisfactory definition therefore is rendered more difficult by alphabetic arrangement; definitions have to be much more detailed than when it is possible to refer to preceding definitions.

In large alphabetical dictionaries contradictions between definitions that are separated in space are almost unavoidable. An alteration in one place necessitates numerous alterations in other parts of the dictionary. When the dictionary is being compiled it is difficult to ascertain to what extent the contents are complete; when selecting material for a technical dictionary, it is almost impossible to proceed otherwise than on the principle of a system.

SYSTEMATIC DICTIONARIES OF EXPLANATION.

In the British Standards Institution “Glossary of Electrical Engineering Terms” (illustration 3) the alphabetic is replaced by the systematic arrangement. The terms follow one another in accordance with the relationship between the concepts. By this means the above defects are avoided. Large systematic dictionaries can be published in sections; if one section is out of date, a new edition of it can appear independently of the other sections. Alphabetic dictionaries on the other hand are of little use unless they are complete.

* See “Wüster, Internationale Sprechnormung in der Technik,” Berlin: V.D.I.-Verlag-1931. Here, too, numerous references to literature bearing on the subject of this paper will be found.

The majority of the unilingual dictionaries of the Internationale Elektrotechnische Commission (see Section 4), founded in 1906, were first planned alphabetically. But after many years' experience it was decided, in 1924, to change over in every case to a systematic arrangement.

When the arrangement is systematic, it is possible in general to use single explicit definitions as starting points. Then you get a "Text" dictionary, as exemplified in "Technologisches Handbuch der Elektrotechnik und der Elektrochemie" (illustration 4), which is far less bulky. Such a dictionary can also be used as a text book.

Systematic arrangement has one disadvantage compared with the alphabetic: it is impossible to find words without exercising thought. This disadvantage is obviated by appending to systematic dictionaries an alphabetic index. Even so, it takes a little longer to find a word than it does in an alphabetic dictionary. Systematic dictionaries are bulkier and cost more to print.

In order to combine the advantages of the systematic and alphabetic arrangements the main systematic groups are sometimes arranged alphabetically in themselves. Example: "Nomenclature for Aeronautics" of the U.S.A. National Advisory Committee for Aeronautics. (Illustration 8.) We may here anticipate part of section 3 (on translation dictionaries) by noting that this arrangement is used mainly for small travelling dictionaries. It is essential to be able to find a word quickly in these; in any particular situation, say, at the post office, you need only look in the relevant systematic section.

SYSTEMATIC ENUMERATING DICTIONARIES.

Definition is the delimitation of concepts. Hence, it is sufficient for many purposes to give a systematic series of terms *without* definition. The Standardising Committees, for instance, have published lists of words which resemble illustration 1, if you imagine it without the figure; one single term of all the synonymous terms given is to be emphasised as the standard term. Even when few synonyms, or none at all, are given, the mere systematic arrangement of such lists suffices in spite of homonyms to enable you to grasp the meaning intended. This is clearly brought out in the system of concepts of the Universal Decimal Classification; here, again, it is strikingly obvious to what extent systematic arrangement can render detailed explanations unnecessary. (Illustration 9.)

ILLUSTRATED DICTIONARIES.

In so far as illustrations are used as adjuncts to definitions they supplement these effectively.

But often illustrations are used instead of definitions, especially in translation dictionaries. In that case they are inferior to definitions in two respects. For one thing you never know exactly how extensive the group of individuals is intended to be, that an illustration represents. You cannot know the "degree of abstraction." The picture of a three-phase slip ring motor may indicate the following degrees of abstraction: Three phase slip ring motor—electric motor—motor—machine. The same disadvantage occurs in the learning of words by the direct method (Berlitz school): The teacher points

out an individual thing but means a concept—*i.e.*, a group of individuals. The second defect of illustrations lies in the fact that they do not make the grammatical category clear; the picture of a runner may indicate a “runner” or “to run” or even “hurry.”

3. THE KINDS OF POLYGLOT DICTIONARIES.

ALPHABETICAL TRANSLATION DICTIONARIES.

As an example: Hoyer-Kreuter “Technological Dictionary,” J. Springer, Berlin, 1932, represents a revised edition of what is probably the oldest technical-scientific dictionary of this kind. (Illustration 10.) Alphabetical translation dictionaries possess fundamentally the same defects, compared with systematic ones, as the unilingual alphabetical dictionaries have. But owing to there being more than one language these defects are even more strongly marked.

One is tolerably familiar with the system of concepts of one’s native tongue. But to find out the equivalent in a foreign language it is necessary to know its relation to the system of concepts of that foreign language. This is more or less possible when the systematic arrangement is adopted; for then the expressions for neighbouring concepts in the foreign language are grouped together.

In any case, a polyglot dictionary—say in six languages—can be alphabetically arranged only according to one language; to change the order of words six times would involve too much wasted space. Hence, for the other five languages recourse must be had to an alphabetical index in one language, just as in systematic dictionaries. Otherwise, a special edition for each of the six languages must be printed, in which each in turn comes first; but the cost of setting up and of writing out is thereby unnecessarily increased.

The disadvantages of alphabetic arrangements can be, to some extent, obviated by putting the principal terms only in alphabetical order; these key words are then followed by systematic groups. In the Dabovich-Heinz dictionary (illustration 11) the key word “piston” is followed by eleven attributes of a piston, twenty-eight kinds of piston, and twenty-three parts of a piston.

SYSTEMATIC TRANSLATION DICTIONARY.

The most important publication in systematic engineering dictionaries is the Illustrated Technical Dictionaries in six Languages (I.T.D.) by Schlomann.

In Section 2 it was pointed out that systematic arrangement greatly facilitates the compilation of a large technical dictionary and also prevents it from getting out of date. The history of the I.T.D. demonstrates this particularly clearly. From 1902 to 1905 the V.D.I. collected about three and a half million slips for an alphabetic dictionary. The cost of this amounted to half a million gold marks. Then the V.D.I. recognised how hopeless it was ever to complete the work. It dropped its own project of an alphabetic dictionary and gave its support to the systematic dictionary (I.T.D.) of Schlomann, who made his debut in 1906 with a small volume on Machine Parts. Up to date seventeen volumes of the I.T.D. have appeared, which comprise in all some 100,000 concepts. Volume 2

(Electrical Engineering), of which the first edition appeared in 1907, has been completely revised independently of the other volumes. (Second edition 1928.)

Systematic arrangement in mere translation dictionaries is, undoubtedly, much superior to the alphabetic; but even the former does not suffice for perfect co-ordination between the expressions in the different languages, because the system of concepts varies with the language. Engineering suffers least from this defect. Nevertheless, there are unmistakable signs in the I.T.D., for instance, that the concepts it contains have been selected and arranged by Germans. In the volume of Electrical Engineering various series of concepts are lacking which, owing to their frequent occurrence in England, have found a place in the far less bulky British Standards Dictionary of Electrical Engineering. As an example, we may take the fundamental concept "rating." In the I.T.D. we find at most a few chance applications of the particular English expression.

As a systematic arrangement follows the system of one single language, it is not possible to get a *clear* picture of the system of concepts in other languages, even from a systematic translation dictionary. It is utterly impossible to get to know the network of concepts in foreign languages; however, these interest the engineer only in so far as there is a close conceptual relationship between the individual units of the network.

These defects are found to a higher degree in dictionaries of explanation with translations appended. Such as "Handwörterbuch des elektrischen Fernmeldewesens," Berlin, 1929, J. Springer. (Illustration 2.) For in compiling these books attention is explicitly concentrated on the system of concepts of one single language.

To some extent these defects may be obviated by giving a definition of each of the expressions with their equivalents in the different languages. Instead of different definitions a supplementary note may be added which expressly draws attention to the differences in the system of concepts and the network of meanings. Note in the example (illustration 13) the remarks appended to "Armature winding," "Dynamo," and "Insulation."

4. DICTIONARIES AND STANDARDISATION.

The most reliable form of translation dictionary would be one which set side by side the systems of concepts of the languages to be compared; an attempt has been made to suggest this process by the juxtaposition of illustrations 2 and 3 which are exhibited at the Conference to demonstrate this paper. In contradistinction to the unilingual dictionaries, the translation dictionary would, in addition, have to show clearly which terms in the various systems of concepts are completely, or only partially, equivalent to each other. For this purpose the systems of concepts would have to be depicted in as graphic and uniform a manner as possible—*e.g.*, in the form of genealogical tables. Secondly, equivalents should be indicated by optical means so far as possible—*e.g.*, by the addition of numbers.

The compilation of such very valuable translation dictionaries requires thorough scientific knowledge of the special subject. But the most complete knowledge of the subject is useless or wasted,

so long as the idiom in the various countries is not fixed. It is a hopeless task to combine six systems of nomenclature with one another when these are, in fact, not single systems but galaxies of systems.

That is why a highly scientific association of workers in the sphere of international technical dictionaries, namely, the International Electrotechnical Commission (I.E.C.), founded in 1906, began with the development of national dictionaries of standard technical terms. Up to date such dictionaries have been published in eight countries. The national terms are now to be put together in an international dictionary. It is a comparatively easy task, yet one of great importance, in the national standardisation of a language to cut out superfluous synonyms, as was referred to above in relation to illustration 1. Since the war in almost every industrial country in the world there are standardisation committees which are doing similar work in other spheres of engineering. International standardisation of language necessarily presupposes national standardisation.

In addition to the linking up of languages there is a higher form of international standardisation of terms, which is not only possible but desirable. That is the superimposing of an international system of concepts upon the national systems. The Universal Decimal Classification (illustration 6) pursues this object as well as that of the international standardisation of engineering subjects, though the latter is subsidiary to the former. An international system of concepts must be built up in such a way that arbitrary selection in the formation of groups is reduced to a minimum, while at the same time the system resembles, as far as possible, the national systems of concepts. In order to arrive at terms for international series of concepts, it facilitates the international exchange of views to make use of a "planned language"; national languages are too closely bound up with national systems of concepts. In this respect very encouraging results have been achieved by the use of Esperanto, as was noted in a paper at the International Electrical Congress in Paris in 1932. Illustration 14 shows a mathematical "text dictionary" in Esperanto which was published as early as 1905.

5. BIBLIOGRAPHY OF UNILINGUAL DICTIONARIES.

All scientific text books and books of reference may be used as systematic unilingual dictionaries. Of actual dictionaries those are the most reliable which have been published by the National Standardisation Committees. These are obtainable for many branches of engineering. For individual references see footnote on page 77.

6. BIBLIOGRAPHY OF THE MOST IMPORTANT POLYGLOT DICTIONARIES.

Owing to limited space references are only given for General Engineering and for those two branches which are internationally most important—*i.e.*, Electrical Engineering and Transport. For languages the following abbreviations are used: A. for English, Ce. for Czech, F. for French, G. for German, H. for Spanish, Ho. for Dutch, I. for Italian, Pl. for Polish, Pt. for Portuguese, R. for Russian.

GENERAL ENGINEERING.

Alfred Schlomann. *Illustrierte Technische Wörterbücher*, I.T.W., Munich, Oldenbourg, 1906-1925, Berlin: Technische Wörterbücher-Verlag, since 1928 systematic G-A-R-I-F-H; to date 16 volumes of 400 to 2,000 pages, divided according to subjects.

Hoyer-Kreuter and Alfred Schlomann. *Technologisches Wörterbuch*, Berlin: Springer 1932. Alphabetic G-A-F or A-G-F or F-G-A one volume of each of about 800 pages.

Ernest Slater. *Pitman's Technical Dictionary of Engineering and Industrial Science*, 1928. Alphabetic A-F-H-I-Pt-R-G; 4 volumes altogether 2,210 pages.

ELECTRICAL ENGINEERING.

Schlomann, I.T.W. See above, volume 2, second edition, 1928. Contains 1,304 pages. Including Electrochemistry, but without Telegraphy or Telephony.

O. Sattelberg, *Wörterbuch der Elektrischen Nachrichtentechnik*, Berlin: Springer, 1925-1929. Alphabetic A-G or G-A or F-G or G-F. One volume of each of 180 to 320 pages.

Comité Consultatif Internationale des Communications Téléphoniques à Grande Distance (C.C.I.), *Vocabulaire Téléphonique Internationale*, Paris: Eyrolles, 1931.

Further:

P. W. Sharroo-G. J. Van de Vell. *Technisch Woorden-boek Vierde Deel (Elektrotechniek)* Amsterdam, 1924. Systematic Ho-G-A-F; 488 pages.

Stanislaw Odrowaz Wysocki, *Słownik Elektrotechniczny*, Warsaw: Nakład Ministerstwa Robót Publicznych, 1929. Systematic. Pl-Ce-R-G-F-A; 232 pages.

TRANSPORT.

Schlomann, I.T.W. Volume 5 (*Eisenbahnbau und Eisenbahnbetrieb*), 1909; 884 pages.

Schlomann, I.T.W. Volume 6 (*Eisenbahnmaschinenwesen*), 1909; 796 pages.

Schlomann, I.T.W. *Vollo (Motorfahrzeuge)*, 1910; 996 pages.

Bruno R. Dierfeld, *Autodiktionaer*, Berlin: Valentin, 1929, alphabetic G-F-A, or A-F-G, 1 volume, each of 176 pages.

Dabovich-Heinz, *Nautical Technical Dictionary*, Pola: Mitteilungen a, d, Gebiete d. Seewesens. 1883-1910. Alphabetic G-I-F-A and I-G-F-A (2 volumes of 1,248 plus 872 pages) or A-F-G-I and F-A-G-I (2 volumes of 1,355 plus 1,115 pages).

Paasch, von Kiel zum Flaggenkopf, Hamburg 1885, reprinted 1908. Systematic, A-F-G-H-I.

Schlomann, I.T.W. Volume 17 (*Luftfahrt*), 1932. Systematic like the earlier volumes, but as an exception only G-A-F-I; 337 pages.

J. Vanier, *Dictionary of Aeronautical Terms*, N.Y., 1929. Alphabetic G-A-F and F-A-G; 141 pages.

Scientific and Technical Abstracting: A Report on the ASLIB Enquiry.

PRESENTED BY MR. A. A. ELDRIDGE.

The subject of scientific and technical abstracting, and various problems connected therewith, has often arisen at the annual meetings of the Association. It is one with which many members are concerned both as producers and as users of abstracts. For this reason the Council decided that a special conference of members particularly interested should be held separately from the Annual Conference, and Mr. Tizard agreed to convene this meeting, which was held last summer at the Imperial College of Science and Technology. The invitation was to attend an "informal conference to discuss and interchange experience on some of the problems of preparing and utilising abstracts of scientific and technical literature," and it was accompanied by a word or two of explanation of the intention in the minds of those responsible for calling the conference and a list of possible subjects for discussion:

There is no intention or desire to draft any universal scheme of abstracting nor to attempt to persuade any of those taking part in the free discussions, which it is hoped will arise, to alter their own system or procedure. At the same time it is anticipated that the widely different experience of those it is hoped to assemble will, if pooled, prove of considerable interest and value to all. Obviously the discussion might cover a wide field and the following are merely a few preliminary suggestions, for it is hoped that those taking part in the conference will propose others and that some of these subjects will be thought worthy of further consideration at some future date.

1. Methods for securing comprehensive abstracts from international sources
2. Limitations of individual field and advantages or disadvantages of overlapping.
3. Relative advantage of "Critical" and "Analytical" Abstracts.
4. What are best methods of dealing with foreign publications?
e.g.: By the same staff as deal with English abstracts.
By correspondents in foreign countries.
By co-operation with foreign societies.
5. Is there any need for special treatment of some foreign publications—*e.g.*, Russian, Japanese.
6. Relative merits of a small permanent abstracting staff and a panel of part-time abstractors or other personnel arrangements.
7. Guide and rules to Abstractors. What is the experience of different Societies?
8. The desirability or otherwise of some sort of uniformity in the form of the abstracts.
9. A consideration of methods of classifying and indexing abstracts.
10. The preparation of annual and decennial indexes.
11. "Time Factor." How important is the prompt publication of Abstracts?
12. Economics of the preparation and publication of Abstracts. Possibilities of mutual help by pooling of experience.

It was necessary to limit the size of the meeting and, generally speaking, invitations were confined to those directly concerned with the preparation of abstracts for publication. Nevertheless, about forty delegates attended and discussion proceeded vigorously. It ranged over many of the topics which had been suggested, but was,

at the suggestion of the Chairman, directed particularly towards problems connected with the abstracting of foreign literature. Finally, it was proposed and unanimously agreed that a questionnaire should be issued to those bodies represented at the meeting and others, and a small committee was appointed to prepare and issue the questionnaire. This consisted of Mr. A. A. Eldridge, of the Bureau of Chemical Abstracts, as Chairman; Mr. Freeman Horn, of the British Aluminium Company; Dr. R. S. Hutton, of the British Non-Ferrous Metals Research Association; Mr. W. A. Pool, of the Imperial Bureau of Animal Health; and Mr. C. A. Spencer, of the Department of Scientific and Industrial Research. The committee was asked to collect information as to methods employed by the various bodies, particularly as regards foreign literature, and the instructions and rules issued to their abstractors.

Incidentally, a suggestion was made that the service of the ASLIB Panel of Expert Translators should be extended so as to include abstractors. Members of the Association will be interested to know that this suggestion has been acted upon. All those enrolled on the Panel have been circularised with an enquiry as to their willingness and ability to undertake abstracting work, with the result that the services of abstractors, familiar with a wide range of subjects and languages, may now be obtained through the medium of the Panel.

Preliminary discussion regarding the nature of the information to be elicited occupied some time—particularly as it was desired so to frame the enquiry that, besides gathering information, it should be suggestive of alternative procedures—and in consequence of this and of the absorption of the public attention by urgent political and economic affairs, the questionnaire was not issued until late in the year. The great majority of those to whom it was applicable replied, and about fifty completed files were received from abstracting agencies of all sizes and kinds, including nearly all the most important in the country. This is the first available opportunity of acknowledging publicly the indebtedness of the Association to those who gave so much time and trouble in completing the questionnaire. There were no less than twenty-five questions, and most of them were divided into several parts. Replies were received from the following organisations:

Imperial Bureau of Animal Nutrition.
 Imperial Bureau of Plant Genetics.
 Oil and Colour Chemists' Association.
 Department of Scientific and Industrial Research (Building Research Station).
 Hadfields, Ltd.
 Imperial Institute of Entomology.
 North East Coast Institution of Engineers and Shipbuilders.
 Low Temperature Research Station, Cambridge.
 Society for Psychical Research.
 Imperial Bureau of Soil Science.
 Institution of Automobile Engineers.
 Institute of Metals.
 Institution of Electrical Engineers (Science Abstracts).
 Metropolitan-Vickers Electrical Company, Ltd.
 Imperial Bureau of Animal Genetics.
 Bureau of Hygiene and Tropical Diseases.
 Empire Cotton Growing Corporation.
 British Non-Ferrous Metals Research Association.
 Department of Scientific and Industrial Research (Fuel Research Division).

Air Ministry.
 Department of Scientific and Industrial Research (Water Pollution Research Board).
 Department of Scientific and Industrial Research (Radio Research Board).
 Imperial Bureau of Agricultural Parasitology.
 Journal of the Textile Institute.
 National Institute for Research in Dairying.
 Imperial Bureau of Fruit Production.
 Linen Industry Research Association.
 World Power Conference, British National Committee.
 Imperial Chemical Industries, Ltd. (Dyestuffs Group).
 Imperial Bureau of Plant Genetics.
 Wool Industries Research Association.
 Safety in Mines Research Board.
 British Medical Journal.
 The Ceramic Society.
 The Pharmaceutical Journal and Pharmacist.
 Quarterly Journal of Pharmacy and Pharmacology.
 Royal Photographic Society.
 Paint and Varnish Research Association.
 Edgar Allen and Co., Ltd.
 Institution of Civil Engineers.
 Institution of Petroleum Technologists.
 Society of Glass Technology.
 Imperial Mycological Institute.
 Royal Microscopical Society.
 Imperial Bureau of Animal Health.
 Imperial Forestry Institute.
 J. Lyons and Co., Ltd.
 Kodak, Ltd.
 British Cast Iron Research Association.
 British Aluminium Company, Ltd.
 Bureau of Chemical Abstracts.

Careful examination of the material has not led to the proposal of any clearly-defined scheme of co-operation among abstracting agencies; indeed, it was never intended to propose schemes, but rather to elucidate the facts of the position and to lay them, in terms of a general report, before the Conference. The committee was very much gratified at the ready and full response, and was even a little dismayed at the mass of material to be digested. It soon became evident that a large part of the information placed at its disposal would not lead to any immediately helpful conclusions, except to emphasise that different needs demand different methods, and that a policy of "collaboration at any price"—even that of individual efficiency and convenience—is as little worthy of recommendation as the "specialist isolationist" attitude. Nevertheless, this comparatively unremunerative information has cleared the air of various doubtful points, and will provide a most useful background for gradually implementing an acceptable policy of "mutual assistance without interference." Other replies clearly indicate several matters which might with advantage be pursued further in the hope of securing economies or improvements in the services offered by agencies prepared to collaborate.

Some generalisations and particulars of replies of general application are noted below, but it should also be remembered that fuller information is in the possession of the Association and will be made available—subject, where necessary, to the consent of the authors—in reply to the individual enquiries of members of ASLIB and of others who took part in the enquiry.

Few of the questions could be answered by a simple affirmative or negative, and hence graphical or tabular treatment is impossible. Moreover, every reply must be considered in relation to the institution that gives it if its true value is to be assessed, since practice obviously varies according to the use made of the abstracts by those for whom the particular service is intended.

For example, the first question was : " How is the original literature checked as regards (a) Receipt of complete files, (b) Catholicity of survey? " To (a) some reply " checked by the editor," or " usual library methods," whilst others give details of systems which vary in complexity but all depend on the use of cards, registers, or progress sheets. In some cases where the abstractors are each responsible for specific fields this matter is left to them. With regard to (b) the simplest case is where abstracting is confined to journals considered sufficiently important to be purchased regularly by the institution. In nearly every case a list of such journals is the basis of the survey ; a variety of extended surveys is built on this foundation by more ambitious services. A great many examine regularly the less important journals in other libraries, some depending on selected abstractors to do this independently or in consultation with the editor or a records' officer. The assistance of corresponding members of the institution is often invoked for this purpose. Some make a practice of watching the abstracts published by other agencies in the same or in adjacent fields and, where necessary, securing permission for their use. In a few cases formal co-operation with other institutions is arranged to facilitate the task of selection.

The survey appears to be limited in some instances by the question of expense and there is, perhaps, room for greater co-operation between abstracting organisations, at any rate, in relation to the purchase or examination of journals of secondary, but by no means negligible, interest. In a common field, arrangements for diminishing the expense of overlapping material may be possible, although a distinction should be drawn between overlap in preparation and overlap in publication. The latter may be unavoidable in practice, and, indeed, may well be an essential factor in the provision of efficient services ; the former might, in some cases, be eliminated almost entirely by collaboration in the examination of the literature and in the preparation, and even checking and editing, of the abstracts themselves. This question of overlap was too complex to be raised in the questionnaire, but it is one which deserves the close consideration which it is already receiving in certain sections of scientific abstracting.

Although a certain number of institutions depend partly on literature not in their own possession, the majority purchase most of the journals which they abstract, and retain the journals in some form after use. The usual practice after the abstracts have been made is to file the journals intact and to make them available to users. Some organisations may care to reconsider whether the advantage of limited availability of journals between their receipt and the publication of the abstract would outweigh the editorial inconvenience involved. In other cases the sale or presentation of the used journals to a local public library or to a special library available to the abstract

users might conveniently solve the storage problem while sufficiently preserving accessibility.

Another question asked whether a photostat service was available for members or subscribers. Such a service is by no means general, and this is one of the matters about which it appeared that the possibility of co-operation might be explored.

Then followed a series of questions designed to elicit information on details of method in selecting papers for abstraction, checking for originality, guarding against duplication, and so on. The replies illustrate the difficulty of presenting the results of the confidential enquiry in general terms. The bodies taking part in the enquiry vary so much in size, in the nature of their organisation, and in the requirements of the people they serve that their answers have to be considered individually in relation to these matters. On these points and others such as policy regarding the abstraction of original work of poor quality, methods of checking abstracts, forms of publication, and ways of preservation, means of obtaining and selecting abstractors, whether abstractors are full or part-time workers and the relative advantages of the two systems, what qualifications are most highly regarded in abstractors, whether an information service is offered, how the difficulties regarding inaccessible journals are overcome, the length of abstracts, it is possible only to remind those interested that the Association, with this valuable analysis of experience before it, will endeavour to make useful and practical suggestions in reply to specific requests for advice.

The question "If the paper includes an author's précis is this used in lieu of an abstract?", recalled the divergent views expressed during the discussion at the 1931 meeting. Fifteen gave a definite "no" to this question. Six said "occasionally" or "rarely." Twenty-two replied "yes," but, in nearly every case, qualified the statement—"if suitable," "if of the right length" and pointed out that, if they accepted the author's précis, they did so with an eye on the paper itself. Of those who never use the author's own abstract several expressed themselves emphatically on the inadvisability of accepting it, their main point being that abstracts must be written from the point of view of the user for whom they are intended. No doubt some who use the author's précis would agree with this view, accepting the précis only if they considered that the author's point of view coincided with their own.

It seems to the committee that the extreme attitude sometimes taken by specialists on this question—that abstracts are useless except when written by a worker in the same corner of the same field—is untenable. It denies the usefulness of important agencies like the Bureau of Chemical Abstracts, which serve workers in every part of a wide field; nevertheless, the policy of that agency, which is to ensure that an abstract shall be both written and scrutinised by those who are familiar with the subject and its principal complexities, has much to recommend it.

The question relating to the qualifications required in an abstractor for foreign work and those relating to matters of payment elicited the fact (which made some of the questions put pointless in many cases) that a large amount of abstracting is done as part of their duties by the salaried officials of the institutions concerned. In such cases,

of course, they are not selected primarily for their attainments as abstractors and the abstracting work they do is not paid for separately as such. As the result not a great deal of information dealing with rates of payment was obtained. The commonest method of payment is according to length of the *published* abstract and the piece rates vary very much. A few instances are: 30s. per 1,000 words, 10s. per page of 500-600 words, 6s. 9d. to 9s. per 500 words, 3d. per line of 12 words. There appears to be no standard, but the number of answers given was insufficient to permit of generalisation. Another method is to pay a flat rate per abstract irrespective of its length. These rates, in the few cases mentioned, varied from 5s. to 10s. per abstract. Yet another method is to pay a higher fee for abstracting from a paper in a foreign language.

Having regard for the emphasis on foreign abstracting one of the most important questions was: "Have you any effective means of quickly getting into touch with abstractors who combine the requisite technical knowledge with a thorough knowledge of a difficult language (Russian, Japanese, Polish, Czech, Hungarian, etc.)?"

The majority reply that they have no effective means but it was thought rather significant that there was little indication that this was regarded as a difficulty. Probably that is due, to a great extent, to the fact that the output in the difficult languages is thought to be insufficiently important and, to a smaller extent, to the fact that this output is dealt with in some indirect way. Quite a number said definitely that their survey did not extend to publications in the languages mentioned. Several said that they had no difficulty except with Japanese and Hungarian. One or two answered the question with a simple affirmative, suggesting that they may be in a position to afford considerable assistance to other agencies; further information is being sought.

Several more questions dealt particularly with abstracting of foreign literature—*e.g.*, as to the advantages of employing foreign abstractors abroad, exchanging abstracts with foreign institutions, and so on. Comparatively few institutions dealt with these questions and it appeared that the majority did not make any exhaustive survey of the foreign literature in their fields. Neither is there general adherence to any one system of transliteration of names in non-Latin scripts.

ASLIB has been described as an association mainly of information users, and as such is concerned to promote efficiency in the services offered to its members by the agencies which undertake to provide abstracts. Such an agency may decide deliberately that the foreign literature is beyond its scope and beyond the interest of its users. If, however, the exclusion of all or parts of foreign literature is due rather, as the committee suspect, to practical difficulties, it would be inexcusable if the agencies neglected any possible means to overcome these obstacles and to improve their services. The committee believe that this is one of the points which need further exploration, and one of the principal opportunities for co-operative enterprise.

One question was: "How soon after receipt of the original is the abstract available to clients?"

The answers were as follows: 3 to 6 months; maximum of 3½ months; 2 weeks to 2 months; 8 to 12 weeks; 6 to 9 months; 2 months; 1 month; 1 month; 1 to 2 months for important matters,

3 to 6 months for others ; 4 to 5 months ; 3 to 9 days ; 4 to 6 months ; 3 months ; 2 to 4 weeks ; 2 weeks ; 2 months ; 2 to 3 months ; 1 to 3 months ; 2 weeks to 2 months ; 6 to 12 months ; up to 3 months ; 2 months ; up to 2 months ; 7 to 12 days ; 4 to 5 months ; 1 month ; 3 months ; 1 month ; up to 6 months ; up to 6 months ; 4 weeks to 4 months ; 2 to 4 months ; 1 month ; 5 months ; within 3 months ; 3 to 6 months.

The answers are presented in this form to give a general idea but they really need to be related in each case to the frequency of publication of the particular publication. The replies do, however, emphasise the fact, very often urged upon ASLIB by its industrial members, that the tempo of abstracting publications is too slow. Those who state a particularly short time are all firms which prepare abstracts mainly for their own uses and industrial research organisations which serve such firms. It should be remembered, however, that if an abstract is not published for a long time after the appearance of the original paper it does not necessarily mean that the abstract is not available earlier for users or some users.

A related question raised the point as to whether speed or accuracy is the more important when both cannot be achieved. The great majority prefer accuracy. This alone indicates that abstract journals are to be ranked as compendia for reference, and not as mere current directories to fuller sources of information. Here is a most important consideration, which ought to determine the policy of every abstracting organisation and pervade the work of every abstractor. No longer can it be said, with Bacon, that "Some books also may be read by deputy, and extracts made of them by others ; but that would be only in the less important arguments, and the meaner sort of books." The abstract literature has become one of the most important weapons in the research worker's armoury ; a privilege which carries with it the responsibility of consistently high efficiency. Only by frequent and systematic search for their deficiencies, followed by the adoption of co-operative or other (often more expensive) methods for their removal, can existing agencies, however specialised, retain the confidence of those who seek to increase the store of human knowledge and power.

DISCUSSION.

MR. A. A. ELDRIDGE, in presenting the report of the Abstracts Committee, explained that the confidential nature of the enquiry placed limits on the amount of specific information which could be communicated, but he reminded those interested that much detailed information was available at headquarters, and would provide the General Secretary with guidance in replying to requests for advice on questions of policy or procedure. Broadly speaking, there seemed to be in many cases a considerable restriction on the width of surveys, particularly in regard to foreign literature ; in so far as this might be due to expense or other practical difficulties, the Association was anxious to help in whatever way might be acceptable.

MR. C. H. GRAY asked that the Abstracts Committee should consider sending a detailed analysis of the results of the questionnaire to those organisations which had contributed information. He would like to see abstracts and translations issued co-operatively by organisations on an international basis, rather than the abstracting of the literature of other countries in every country.

MR. R. BRIGHTMAN suggested that if the Committee would issue some statement of principles which were generally incorporated in the instructions issued to abstractors it would be very useful. Abbreviations were a particular point,

especially in view of the desirability of using uniform abbreviations in journals. The use of abbreviations in journals was another vexed point which might easily cause difficulties in abstracting. A definite field for co-operation existed in the pooling of journals for abstracting purposes, and he would be glad to assist in any developments in this field. So far as his own organisation was concerned, while they observed the importance of preparing abstracts from the users' point of view—that is, in relation to the main purposes of the organisation served by the abstracting or indexing bureau—they did not consider that specialists were generally the best or even efficient abstractors. The best results were obtained with full-time abstractors with a reasonably full and good technical training.

MR. FREEMAN HORN discussed the question of overlapping in abstracting services and said that members were looking to the Committee to reduce this where possible. Members also need to know the sources of abstracted information in industries other than their own. He suggested the release of abstracts prepared by particular organisations for use by others with due acknowledgement.

DR. R. S. HUTTON emphasised the importance of the Committee's work as the first attempt in this country to secure the co-operation of a large number of abstracting organisations. The work had advanced only to the first stage, and he suggested that its extension would be most useful first in the directions indicated in the report, particularly in regard to assembling and comparing experience of printing costs. He suggested also that the growing practice of providing an author's precis might be made even more useful if it were carried out on agreed systematic lines by authors and editors. He looked to the work in hand to lead more nearly to perfection in national abstracting services and possibly to some form of international co-operation.

MISS GUINEY, in a communication presented by DR. HUTTON, wrote: In connection with the present discussion on the abstracting of foreign literature it may be of interest to the Association to know to what conclusion the forest research organisations of the world have come, only within the last few days. The Director of the Imperial Forestry Institute, of this University, has long been working in collaboration with his foreign colleagues in an attempt to settle the question for our own needs, and a method of gathering information and distributing it between various countries has just been agreed to at the Congress of the International Union of Forestry Research Institutes held at Nancy in France early this month and attended by delegates from all the principal countries. The agreement which was adopted, with a resolution inviting each country to appoint an institution to undertake the preparation of its own references, is as follows:

“A scheme for the publication of references to current forest literature should aim at (1) distributing the cost and labour as far as possible among the different countries, and (2) issuing the references as soon as possible after the publication of the original material. The following scheme is proposed with these objects in view: (1) Each country should prepare references of current literature published in that country, giving the complete title in the language of publication, (with, if necessary, a translation into French, English, or German), the author, the publisher, and the price of the work; if the title gives insufficient information as to the contents of the publication, a resumé of a few lines should be given. Mention should be made of any existing summary, and of the language in which it is given. The country forwarding these particulars should also give the reference number according to the system of classification adopted for international forest bibliography. (2) These references should be duplicated and a copy sent quarterly to each other country in exchange for the references of that country. (3) Each country should then publish the combined references in its own language in such a way as may be found most suitable for its own needs. (4) Duplication and unnecessary expense could be avoided if countries speaking the same language would combine for the issue of references in that language from one centre only.”

International Financial Relationships and the World Depression.

By F. W. PETHICK-LAWRENCE, M.A.

[EDITORIAL NOTE.—At the Conference Mr. Pethick-Lawrence gave an extempore address, of which the following is only a summarised report. Readers who are interested will find Mr. Pethick-Lawrence's views on this subject *in extenso* in his book, "This Gold Crisis" (Gollancz, 3s. 6d. net).]

Mr. Pethick-Lawrence expressed his deep sense of responsibility in addressing so distinguished an audience on a subject fraught with such dire moment to the future of civilisation. He reminded them that the present depression was sapping not only the material, but also the moral basis of the race, and unless checked bid fair to hurl society into the abyss.

The peculiar thing was that even to-day to most people it was inexplicable. If it were true that owing to destruction of wealth during the war, failure of harvests, or some other cause, man had lost his power over production, it would be intelligible that we should have to go short for a bit and tighten our belts. But nothing of the kind was the case. Never was there a time when mankind could produce more easily food, raw materials, and manufactures. Yet we were told that the standard of life must be reduced and economies made even in education. It was scarcely an exaggeration to say that we were starving in the midst of and even in a sense because of plenty.

Ever since the days of Adam man had been struggling to produce so as not only to satisfy his physical needs, but to have something over. Now that the time had come when he had achieved his ambition, it seemed to have proved his ruin. This justified the saying of the philosopher that the universe had to have a madhouse and that this planet was it.

We had no doubt muddled into this crisis and might muddle out of it again, but unless we rightly understood it we were likely to muddle into another similar one later and so on indefinitely. Evolution in the past had no doubt been largely a matter of trial and error, but man claimed to be a rational being and ought to be capable of analysis and forethought.

What was wrong? Politicians in all countries had all sorts of remedies to propose and they were nearly all different. He had only recently returned from a visit to Russia, and the Communists there were quite certain that our disorders were due to our trying to work an obsolete economic system.

Mr. Lawrence said it would be useless for him to try to disguise from the audience, even if he wished to do so, that he was himself a Socialist and that he believed that the system under which we lived had served its turn and would have to give place to a society with a constructive planned economic basis. It was to this end that he was working as a politician. But the audience had not come to

hear his views on that, but on finance, and he was glad to avail himself of the opportunity because he held that faulty finance was the proximate cause of our present situation.

The man in the street was frankly bored with theoretical finance and inclined to leave it all to the experts. But he was finding to his cost that something had gone wrong and that the experts did not seem able to put it right. He was therefore demanding information for himself. This information it was in the power of ASLIB to supply.

Mr. Pethick-Lawrence proceeded to emphasise that finance was not an end in itself. The end was that human beings should have all the things they needed for a full free life. As they did not live to themselves alone, that involved proper exchange and distribution. It was for that that finance existed. Finance was therefore the hand-maid of economics, and the maid must not fancy herself mistress.

What were the kind of transactions for which finance had to be responsible? The simplest were those where there was a unity of both time and place, as when a market gardener sold his fruit and vegetables in a market town and with the money he got for them bought clothes and groceries and tools. There might be unity of time and not of place, as when a British wholesale grocer bought coffee from Brazil. The grocer paid in pounds, the Brazilian wanted Brazilian currency, and the question of the exchange was involved. Again, there might be unity of place but not of time, as when a manufacturer bought machinery on credit in his own country and undertook to repay the cost, say £1,000, some years hence. In this, the purchasing power of money at the two dates—when the contract was made and when the money became due—was a vital factor in the transaction. Finally, there might be unity neither of time nor of place, as when a loan was made by people in one country to those in another.

Finance had to try to settle all these problems. But there were some problems which it could not settle because they were insoluble. When the war was over the Allies, after agreeing to "no indemnities," proceeded to impose "reparations," and discussions took place as to how much Germany could pay. Fantastic sums were mentioned, and a leading British banker even stated that there was no reason why Germany should not find £24,000,000,000. Everybody could see to-day how ridiculous that was, being no less than 240 times the amount which it had recently been decided that Germany could not pay annually. Probably the banker based his view on his knowledge of the aggregate capital wealth of Germany, ignoring the fact that it consisted mostly of such things as harbours, roads, bridges, railway lines, factories, dwelling-houses, etc., which could not be transferred from one country to another. This showed that information, valuable as it was, had to be correctly applied by the person possessing it if it was to be of real service in these matters.

There were many people, said Mr. Pethick-Lawrence, who were not so ill-judged as this banker, but who certainly did not foresee that there was another difficulty about huge debts and reparations, and that was the attitude of the country which was due to receive them. If a nation was entitled to receive a stream of payments there were three things it could do: (1) it could take goods, (2) it could forgive the payment, (3) it could relend the money. Before the war Great

Britain was a great creditor country, and it adopted both the first and the third methods. To a large extent it re-lent the money to which it was entitled every year as interest, but as a free trade country it was always open to receive goods if its debtors chose to meet their obligations in that way.

Since the war the United States was the principal ultimate creditor, but she rejected all three methods. She put up her tariffs to prevent goods coming in, she had not been willing up till now even to consider foregoing the debts, and of late years she had refused to re-lend what was due. Instead, by a kind of false analogy of an individual creditor, she thought she could take what was due in money. That was no solution, because money as such was no use to a nation and was only of use to the individual because he promptly went and bought something with it or invested it. Of course, America could take gold, and if gold had been unconnected with money there would have been no harm in that so long as the supply held out. But gold formed the basis of the currency in many countries, and when America and, to a lesser extent, France took gold in payment of the debts due to them the whole monetary basis of the world became disorganised. World prices fell, and the more the debts were paid off the heavier became the effective burden of what was left behind.

It was no wonder, then, that this country and a large part of the world had been forced off the gold standard. And it was gradually becoming realised that the obligations of nations must be such that they could be liquidated by the flow of goods and services. To imagine that there could be a continual large balance which could be met by a movement of gold was absurd, for there was not enough gold for it to continue to flow in considerable amounts for a long time in one direction. The debts between nations must therefore be completely re-modelled.

With this out of the way finance would be left with soluble problems to tackle, and how was it going to begin? Mr. Pethick-Lawrence said emphatically that the most essential thing was to establish a stable unit of value. They had stable standards of length, of weight, and of volume, and without them trade would be disorganised. Mr. Lawrence illustrated this by imagining that the yard measure were continually to increase and showed how the retailer would be ruined. But stability in the unit of value was the most essential of all, because that affected every transaction where time entered in.

Thus in the lease of a house for twenty-one years at a rent of £100 a year both landlord and tenant agree to the contract because they think they know what £100 means. But if before the twenty-one years are up the purchasing power of £100 considerably alters, all their calculations are at fault. A dealer buying to sell again ceases to do business on a falling market; a manufacturer estimating prospective profits from the sale of a finished product six months hence from processes begun to-day is utterly confounded by a big fall in prices. Again, a manufacturer borrowing money from his banker at five per cent. to instal machinery is really paying interest at twenty-five per cent. per annum if in a year the value of new machinery falls by twenty per cent.

Those who knew the economic history of the last twenty years knew that there had been nothing like a stable unit of value during

that time. In Germany and Austria the departure from stability had gone to grotesque lengths, and at one time a farmer could discharge a heavy mortgage on his farm by the sale of a single egg. But even in this country wholesale prices rose more than three-fold between 1914 and 1920, and had now sunk below their former level.

Mr. Pethick-Lawrence said that there was a discussion going on as to whether these changes in prices were due to monetary or non-monetary factors. That was not the way he looked at it at all. If a man who had a hot water radiator system to keep his house at an even temperature during the winter found that, instead, it was sometimes too hot and sometimes too cold, it was evident the hot water system was not being worked properly; and it would be no answer to his complaint to say that the real cause was the variation in the temperature outside. Similarly, he held that it was the business of those at the centre of finance so to control the monetary system that the unit of value was approximately stable.

Many people were saying to-day that prices were too low and that business could not recover unless a higher price-level was restored. There was no doubt a great deal in that view; but a still more important consideration was whether prices when a reasonable level was reached would stay there. It would be useless in his opinion to secure a recovery in prices if after that our financial authorities were to pin us once more to gold and to subject us to vicissitudes similar to those which we had been experiencing since 1914.

He was therefore definitely opposed to a return to the gold standard and in favour of a managed currency with a stable unit of value. That did not and could not mean, of course, that the price of each individual article would be fixed, but that an index number would be chosen and the desideratum would be that it should remain constant. In more popular language, the object should be that the pound should buy the same basketful of goods to-day, next week, next month, next year, and ten years hence.

It would no doubt be best if this could be done internationally. But it was a very difficult thing to get nations to agree on complicated action, and it might be a long time before agreement on the matter was reached. Therefore, in the meanwhile it would be necessary to act individually. The stabilisation of the pound sterling in terms of prices would be a big step forward, and it would apply not only to Great Britain herself, but also to a large part of the British Dominions and to those countries which had already elected to relate their currencies to sterling instead of to gold.

Partial stabilisation in this way had admittedly its disadvantages. It involved unstable exchanges, but this was a lesser evil than subjecting ourselves and the whole world to the calamities of ruinous alterations in the price-level such as they had recently experienced.

Possibly he might be asked the questions whether the end, if desirable, was really attainable and what were the means to be adopted to attain it. To this he would answer that in his opinion the thing could be done. It might not perhaps be possible to fix the unit of value as rigidly as the units of length, weight, and volume. But if it was found to be increasing steps could be taken to reduce it, and if it was found to be decreasing steps could be taken to raise it. There might, therefore, be oscillations; but the more serious evil

of continued trends in one direction could be relieved or entirely prevented.

As to the means to be employed, these were principally three—bank rate, open market transactions, and public expenditure by the central and local authorities. Highly-technical questions were involved in all these which naturally the experts must be left to deal with. But the essential thing was that the experts should be given instructions by the public as to the objective at which to aim, instead of being allowed to take the public whither they fancied. Experts were most excellent servants, but they could be great tyrants if the public allowed them to become its masters.

Final Session.

At the final session of the Conference the chair was taken by Dr. R. S. HUTTON.

The following resolution, which, on the motion of MR. R. BRIGHTMAN, seconded by DR. A. P. THURSTON, had been passed by an earlier meeting, was adopted unanimously :

That it is desirable that further facilities should be given at the next Annual Conference of ASLIB for the discussion of the establishment and operation of Information Services, and, further, that such discussion should be concerned with specific aspects of the operation of such services, and more particularly with the possibilities of co-operation in the exchange and pooling of information and knowledge.

The following resolution, moved by MR. E. N. SIMONS, was also adopted :

Resolved that this Conference, being of the opinion that the imposition of import duties by the Australian and other Dominion governments on (*a*) books, (*b*) technical journals of a serious and informative character privately published in Great Britain, (*c*) catalogues, prospectuses, and printed matter advertising books, is directly harmful to the spread of knowledge, and is calculated to debar students in those Dominions from access to current information of great value, therefore calls upon the governments concerned seriously to consider the cancellation of these duties.

These two resolutions were referred to the attention of the Council.

On the proposal of DR. R. S. HUTTON, the best thanks of the Conference were offered to the Principal of Somerville College for permission to hold the Conference there. Votes of thanks were passed also to the Bursar and the college staff, to the authors of papers, the chairmen and stewards of meetings, and to the staff of ASLIB.

The proceedings of the Conference then ended.

Report of Seventh Annual General Meeting.

The Seventh Annual General Meeting (fifth since incorporation) of members and associate members was held at 4.30 p.m. on Saturday, September 24th, 1932, at Somerville College, Oxford.

Present : Sixty-five members and associate members were present.

Chairman : Dr. R. S. Hutton (Chairman of the Council of the Association) acted as chairman of the meeting.

ITEM I.

The minutes of the Sixth Meeting, having been circulated, were taken as read. It was agreed that they should be confirmed and signed as correct by the Chairman.

ITEM II.

The audited statement of accounts had been circulated. On the motion of MR. P. C. BURSILL, seconded by ALDERMAN CHARLES SQUIRE, they were accepted.

ITEM III.

On the motion of MR. H. L. JACKSON, seconded by MR. P. C. BURSILL, it was resolved unanimously that Messrs. West and Drake be re-appointed auditors to the Association.

ITEM IV.

The CHAIRMAN announced that the following had resigned their membership of the Council : Mr. H. W. Acomb, Mr. F. B. Bourdillon, Mr. A. P. M. Fleming, Colonel Sir Henry G. Lyons, Lieut.-Colonel J. M. Mitchell, Brigadier-General Magnus Mowat, and Mr. G. B. Willey.

The following had accepted nomination : Mr. Edward Carter, Miss M. E. Cleeve, Miss B. M. Dent, Miss Mizpah Gilbert, Mr. A. A. Gomme, Mr. C. H. Gray, Mr. H. H. Johnson, Miss Norma Lewis, and Mr. P. R. L. Tingey.

On the proposal of MR. H. L. ROBINSON, it was agreed unanimously that the Council be elected as follows :

Theodore Besterman, Society for Psychical Research.

Dr. S. C. Bradford, The Science Library.

A. Brammer, Association of Supervising Electrical Engineers.

Edward Carter, Royal Institute of British Architects.

Miss M. E. Cleeve, Royal Institute of International Affairs.

Miss B. M. Dent, Metropolitan-Vickers Electrical Company, Limited.

James J. Eaton, *The Yorkshire Post*.

H. Vincent Garrett, Rowntree and Company, Limited.

Miss Mizpah Gilbert, Chiswick Public Library and Museum.

A. A. Gomme, The Patent Office.

C. H. Gray, World Power Conference, International Executive Committee.

B. M. Headicar, London School of Economics and Political Science.

F. A. Hoare, Western Electric Company.

J. E. Hodgson, Royal Aeronautical Society.

L. Honeyburn, Imperial Chemical Industries, Ltd.

Miss D. W. Hughes, Career Advisory Bureau and *Journal of Careers*.
 Dr. R. S. Hutton.
 H. H. Johnson, M.I.Mech.E., M.I.E.E., *Engineering*, Limited.
 Miss A. L. Lawrence, M.B.E., M.A., LL.B., British Medical Association.
 Miss Norma H. Lewis, B.A., League of Nations Union.
 Humphrey Milford, Oxford University Press.
 F. C. Mitchell, London Press Exchange, Ltd.
 Colonel Sir Frederic Nathan, K.B.E.
 Lieut.-Colonel L. Newcombe, T.D., F.L.A., National Central Library.
 Mrs. C. S. Orwin, Agricultural Economics Research Institute.
 J. G. Pearce, M.Sc., M.I.E.E., British Cast Iron Research Association.
 A. F. Ridley, F.L.A., British Non-Ferrous Metals Research Association.
 J. C. Stobart, British Broadcasting Corporation.
 Dr. A. P. Thurston, M.B.E., M.I.Mech.E., F.R.Ae.S., M.I.A.E.
 Paul R. L. Tingey, Powell Duffryn Steam Coal Company, Limited.
 J. C. Withers, Ph.D., British Cotton Industry Research Association.

ITEM V.

It was unanimously agreed that Sir Charles Sherrington should be elected as President of the Association.

ITEM VI.

It was unanimously agreed that Colonel Sir Frederic Nathan (Honorary Treasurer) and Miss A. L. Lawrence (Honorary Secretary) be re-elected.

ITEM VII.

DR. R. S. HUTTON then presented the Report on the Year's Work of the Association (see page 13) and a discussion followed.

MR. HUGH L. ROBINSON opened a discussion on "What Members Want of ASLIB," and DR. HUTTON presented some notes prepared by Mr. S. S. Bullock on the proposed ASLIB Guide to Business Information. Owing to shortness of time discussion of these subjects was unavoidably curtailed.

This concluded the business of the meeting.

ASSOCIATION OF SPECIAL LIBRARIES AND INFORMATION BUREAUX.

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30TH JUNE, 1932.

EXPENDITURE.		INCOME.		CR.
To GENERAL EXPENDITURE—				
£	s. d.	£	s. d.	£ s. d.
Salaries	355 0 9	By GENERAL RECEIPTS—		
Rent, Light, and Phone	66 1 0	Membership Subscriptions	708 3 0	
Insurance	2 18 10	Bank Interest	9 4 6	
Printing, Stationery, Postage, and Office Expenses	131 9 2	CONFERENCE RECEIPTS—		717 7 6
Reference Books	3 5 10	Fees and other Receipts	283 6 3	
Travelling Expenses	18 8 9	Sale of Reports	14 8 5	
Subscriptions	5 0 0	Advertisements in Report	23 8 6	
Press Cuttings	2 2 0	Receipts <i>re</i> Translators' Panel	321 3 2	
Audit Fee	6 6 0	Balance, being excess of Expenditure over Income for the Year, carried to Balance Sheet	69 13 0	
Income Tax	4 2 6		74 15 11	
Depreciation of Furniture and Fittings	3 14 10			
	793 14 8			
COST OF 1931 CONFERENCE—				
Conference Expenses	183 6 5			
Printing of Conference Report	115 16 0			
	299 2 5			
Expenses <i>re</i> Translators' Panel	90 2 6			
	£1182 19 7			£1182 19 7

Reports.

Following the Annual General Meeting reports were received from the following organisations whose work is connected with and of special interest to members of ASLIB :

THE NATIONAL CENTRAL LIBRARY.

This report includes that of the Joint Standing Committee on Library Co-operation, whose Enquiry Office is now housed in the National Central Library.

The chief points in connection with the work of the National Central Library during the past twelve months which are of special interest to members of ASLIB are the following :

(1) NEW HEADQUARTERS.

Work on the adaptation and fitting of the new premises which have been presented by the Carnegie Trustees is making good progress, and it is hoped that the building will be ready for occupation next March. In the new building the Library will be able to develop its work in a way that is impossible in its present cramped premises.

(2) INFORMATION DEPARTMENT.

The Information Department is still in its experimental stages, but good progress has been made, and the general lines of development are now becoming settled. The work may be divided into two groups. The former consists of tracing and obtaining books which cannot be supplied by the National Central Library itself ; the other of giving information about books.

Largely through the efforts of the International Institute of Intellectual Co-operation, the business of arranging for the loan of books from libraries in one country to those in another, as well as for the international supply of bibliographical information, is now being systematically organised. The National Central Library is for these purposes the centre for Great Britain. During the past year twenty-nine books, copies of which were not, so far as could be traced, available in Great Britain, have been obtained from America, Belgium, Denmark, France, and Germany. In return, fifty-eight volumes have been lent to libraries in America, Belgium, Czecho-Slovakia, Denmark, Germany, Holland, Poland, Sweden, and Switzerland. The figures are small, but the value of the books obtained in this way is great, and there is little doubt that this side of the work of the Information Department will prove of exceptional value when it is more fully developed.

Until recently there has been a general impression, especially among foreign librarians, that the libraries of Great Britain, though they have been large borrowers, have been unwilling to lend books to libraries abroad. In this connection it is interesting to note that, as a result of enquiries made recently by the National Central Library to fifty-seven of the chief libraries in Great Britain, it was discovered that in the four years 1928 to 1931 British libraries had borrowed only eighty-three books from libraries in nine foreign countries, but had lent no less than 315 books to libraries in twelve foreign countries. During the current year—that is, since March 1st, 1932—the Central Library has received applications from foreign libraries for 183 books. Of these, it has been able to supply 116, and many of the others are still being dealt with.

On October 1st the Library took over the work of the Enquiry Office of the Joint Standing Committee on Library Co-operation. 1,578 enquiries have been received from university libraries in Great Britain, chiefly for scarce books and periodicals. 1,179 of these have been successfully dealt with, 765 volumes having been supplied by the Central Library or its outliers and 415 by the university libraries. 184 of the remaining 399 applications have come in recently and are still being dealt with. The balance of 215 represents books which the Central Library has been unable to supply.

Other work of special value to university libraries which the National Central Library has recently undertaken is that of informing university librarians as to the discontinuance of periodicals in any university library. The object of this service is to avoid the possibility of many of the less important periodicals being discontinued altogether in this country.

(3) UNION CATALOGUES.

Considerable progress has been made towards the building up of a national union catalogue, upon which the efficient and economical working of the Information Department so much depends.

The very important union catalogue of the Outlier Libraries is making slow progress, as no member of the staff is free to do more than sort in the cards which are being received from those Outlier Libraries which send copies of their accessions entries—a piece of co-operation which is of great value. In addition to this, cards are made for other books which are borrowed from the Outlier Libraries. This catalogue, small as it is, is in continual use, and every day books are successfully traced through it. The fact that a collection of some 65,000 entries can provide useful information is an indication of the extreme value of a complete union catalogue of the five million books in the Outlier Libraries. In addition to the cards in the union catalogue, the Library possesses copies of all the printed catalogues and lists issued by the Outlier Libraries. These contain entries for considerably over a million books, but a complete search through them is never possible, since it would mean checking more than a hundred alphabetical lists. With a larger staff these entries could be incorporated in the union catalogue.

The union catalogue of the London Borough Libraries, work on which has now been in hand for two and a half years, is consulted daily and is a means of tracing many books which would otherwise remain unlocated. This catalogue now contains 619,000 entries, and, thanks to the splendid assistance given by the librarians and their staffs, it is growing rapidly. It will be remembered that, to a large extent, ASLIB was responsible for the foundation of this union catalogue.

Another union catalogue which is of great value is that of the periodicals in the university libraries. This, which is now nearly complete, contains some 85,000 entries and includes the titles of the periodicals (on all subjects and covering all dates) in every university and college library in Great Britain and Ireland. The catalogue is now being edited for the press, the Carnegie Trustees having offered a generous guarantee of £2,500 to cover the cost of editing and printing. It is estimated that the catalogue will contain some 40,000 main entries (many of the 85,000 entries representing the same periodical) and 30,000 cross references. It will be of value not only as a means of locating the whereabouts of a periodical required, but also as a bibliography, as it will give an outline of the history of each periodical catalogued. The material in this catalogue is being placed at the disposal of the Editor of the World List of Scientific Periodicals, who, in return, is giving much valuable assistance in the compilation of the universities catalogue.

Another union catalogue of the first importance is that consisting of the duplicate entries of the union catalogues in the Northern and the West Midland Regional Bureaux. The total number of entries at present in this catalogue is 115,700.

The total number of entries in all the union catalogues housed at the National Central Library is now 884,700. This is an encouraging figure, but it compares very unfavourably with the work which is being done in other countries, especially in Germany and America. It is to be hoped that in the near future money may be forthcoming to enable the wonderful library resources of Great Britain to be made more readily accessible.

(4) OUTLIER LIBRARIES.

There are now 125 Outlier Libraries associated with the National Central Library. This figure does not include the libraries in the Regional Systems, many of which are, in effect, Outlier Libraries. The libraries of twelve of the Research Associations are included in the list. These libraries, although little used, are of considerable value, when required, in supplying books on their special subjects. The Outlier Libraries contain 5,037,000 volumes, including some 28,000 sets of periodicals. The number of books lent by 112 of the Outlier Libraries during the year was 6,252. Seven years ago only 362 books were lent by eight libraries. In addition to the assistance given by the Outlier Libraries, fifty-two other libraries have lent a total of 307 volumes to meet special needs.

(5) REGIONAL LIBRARY SYSTEMS.

The year 1932 has seen a most encouraging development in organised library co-operation in England, Wales, and Northern Ireland. The Northern Regional Library Bureau has completed its first twenty months, the West Midlands Regional Library Bureau has been working seventeen months, and the Bureau for Wales ten months, while in Cornwall and Northern Ireland the Regional Systems continue to do excellent work. One hundred and twenty-three libraries in twenty-three counties are now co-operating in the four Regional Systems in England and Wales.

Of these, nineteen are special libraries, five university libraries, eighty-one urban libraries, and eighteen county libraries. Even before the Regional Bureaux have had time to build up their union catalogues or organise their work fully they have been able to provide no less than 3,572 volumes during the year, ending on February 28th. A conference of the authorities of all the libraries in nine of the counties surrounding London is being held in November. As a result of this conference it is hoped that a Home Counties Regional System will be established, with the Regional Bureau at the National Central Library.

The establishment of the Regional Library Systems has already considerably reduced the call upon the Central Library for many books which are available locally, with the result that it has been able to supply a larger percentage of the more expensive and scarce books.

THE WORLD LIST OF SCIENTIFIC PERIODICALS.

Of the new edition now in course of preparation Mr. W. A. Smith wrote: The work is well advanced. After a good deal of trouble we have at length succeeded in getting the material required from the bulk of the libraries concerned. A few extra libraries will be included this time which did not figure in the first edition—*e.g.*, the Geological Survey and Museum, the Medical Research Council, the Department of Scientific and Industrial Research, and others.

Besides the 23,000 entries which appeared last time I estimate that there will be another 10,000 entries of new periodicals. This edition should be much more complete than the first, largely owing to our having been able to consult the material collected by Miss Roupell for the universities list. It will be printed in one volume on both sides of the paper, which will make it more convenient for reference. It is hoped (perhaps optimistically) to publish sometime in the middle of next year. It will be much more up to date than the previous editions, which, published in 1925 (and Volume 2 in 1927) only contained periodicals which had started before the end of 1921. This time everything possible will be included right up to the time of issue—*i.e.*, it will include periodicals started in 1933.

UNIVERSITY OF LONDON, SCHOOL OF LIBRARIANSHIP

The alternative course of training for the University Diploma in Librarianship, for which the Council of ASLIB appealed some time ago to the School of Librarianship Committee, was definitely inaugurated in October, 1931. Four students entered, one of them already holding a post in the Research Library of a Government Department. All four passed the final examination last June. The first three will receive the diploma at the end of their first year's work in an approved library, the fourth still has one more year of approved work to complete her qualification. Two sessional students, including one who already holds the Diploma in Librarianship, took the course in Special Library Services, and each gained a second-class certificate. Five other sessional students, all Norwegians, took the course in Library Economy, three sitting for the examination, one gaining a second-class and the other two second-classes. Several other students attended some of the lectures without completing the course.

The four who took the whole course were, of course, graduates holding the degree of B.Sc. or of B.A. (Natural Sciences), Cambridge. The best was the part-time student, who gained two first-classes and four seconds, and was at the head of the list in Library Economy. The next in merit, also a woman, gained two firsts and four seconds. Of the other two men, one gained two firsts and four seconds, and the other three seconds. The two men, so far as I know at present, are still unemployed; of the two women, the first mentioned is still in the Government Department, but is trying for a better post elsewhere; the second has been appointed Librarian of the Northern Polytechnic.

Up to the present, only one student has enrolled herself for the Special Course in session 1932-33.

NOTGEMEINSCHAFT DER DEUTSCHEN WISSENSCHAFT

This year again the Association has been unable to carry out the limited programme as arranged for during the previous year. The drop in income has led to the abandonment of the distribution of periodicals giving general information for the scientific bodies attached to the separate universities. This has entailed a drop of 7,500 in the purchases of foreign periodicals.

The funds still available after meeting obligations have been devoted to the supply of foreign literature to the State Libraries of Prussia and of Bavaria, and

to libraries having collections confined to special subjects. For new grants the sum of about 130,000 marks could be expended. There has been increase in the further work of the Association, in foreign exchanges of periodicals, in exchange of duplicate copies between German libraries and in the circulating of books to research centres, as these branch activities entail little money outlay. The curtailment of the activities of the Association has given rise to lively protests from the German librarians. From the standpoint of the Association it is deeply to be regretted that international knowledge will be hampered by the breakdown of so many possibilities of exchange of information.

VERMITTLUNGSTELLE FÜR DEN TECHNISCH-WISSENSCHAFTLICHEN QUELLENNACHWEIS.

At the last two sessions of the ASLIB reports were given on the foundation of, and the work already started by, the Agency for Information on Sources of Scientific and Engineering Literature. A good development of this Agency may also be claimed for the year under review. After having issued, in the middle of 1931, the first publication of the Agency, a survey entitled "Vermittlungsstelle für den technisch-wissenschaftlichen Quellenachweis" (Agency for Information on Sources of Scientific and Engineering Literature), it was again found that the new Information Service, created by German engineering organisations, gave rise to great interest not only in Germany, but also abroad. Consequently, a growth of enquiries received by the Agency was observed. Up to December 31st, 1931, the Agency handled 487 enquiries altogether; nearly half of these enquiries were made during the second half of that year—*i.e.*, after the appearance of the aforesaid publication.

The enquiries received up to the end of 1931 may be grouped as follows:

From Individuals	43 per cent.
From Firms	41 per cent.
From Associations	8.4 per cent.
From Authorities	7.6 per cent.

The enquiries made by individuals, in most cases, concerned problems regarding their practical or scientific work. As to the enquiries of the firms, most of them were large industrial enterprises which, so to say, availed themselves of the service offered by the Agency as a means of supplementing the information obtained from their own literary departments. In view of this fact, many possibilities are opened to the future work of the Agency. For instance, middle-sized, and even more, small firms which do not possess their own literary departments may, to their advantage, avail themselves of the services of the Agency, and thus they are not compelled to establish expensive information services of their own. It may be also stated—with great pleasure—that a considerable number of enquiries (amounting to twenty-four per cent.) was received from abroad. The following countries participated in the enquiries from abroad: Argentine, Brazil, Costa Rica, Great Britain and Ireland, France, Holland, Italy, Japan, Latvia, Luxemburg, Austria, Poland, Roumania, Sweden, Switzerland, Spain, Czecho-Slovakia, Hungary, United States of America, and the South African Union.

Although there are still many problems to be solved, all work in connection with the enlargement of the Agency had unfortunately to be discontinued in the spring of this year. In view of the catastrophic situation of Germany, financial restrictions have become necessary in all branches of business, and, therefore, the enlargement of the Agency must be postponed until the return of more favourable conditions. The foundation-stone, however, is laid, and arrangements have been made so that enquiries can be dealt with without delay, even in the days of depression. In the aforesaid publication, which includes information regarding the organisations co-operating with the Agency for Information on Sources of Scientific and Engineering Literature, the Deutscher Verband Technisch-Wissenschaftlicher Vereine (Association of German Engineering and Scientific Societies) has created a reference book with the aid of which everyone will find himself in a position to study the sources of literature in the most important fields of engineering science in Germany.

Messages and apologies for absence were received also from the following organisations:

American Special Libraries Association.
Nederlandsch Instituut voor Documentatie en Registratuur.
Union Française des Organisme de Documentation.
Institut International de Documentation.

Index.

NOTE.—*This is not a complete subject index to the contents of the papers, but only to the names of speakers and the titles of papers, etc. Copies of the eight previous Reports can be obtained from the offices of the Association, price 5s. each, or 30s. for the set.*

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